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Audiovisual Translation: subtitling the BBC's documentary "The Quantum Revolution"

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Introduction

Audiovisual translation (AVT) has been neglected by Translation Studies scholars for many years. Until recent times translation experts mostly centered their investigations on the differences between dubbing and subtitling and whether the former was better than the latter. Nowadays the things have changed, and more and more Translation Studies scholars have entered this field. AVT is now one of the fastest growing areas in the field of Translation studies (TS).

Subtitling is different from other types of translations in many ways. First of all, it does not only consist in translating a text from a source language into a target language but it also involves a shift from oral to written language. In other words, there is a shift from one semiotic system to another.

Research outlined in this dissertation follows my experience of subtitling in an audiovisual translation course I attended at university last year. What has changed is the type of audiovisual text I decided to subtitle. *"The Quantum Revolution"* is a scientific documentary hosted by Michio Kaku. I chose three parts of this one-hour documentary, translated them from English into Italian, and then adapted my translation to the final subtitles. Obviously, I provided both English and Italian subtitles.

This dissertation consists of five chapters. Chapter One is about science communication, how it is done and its uneasy relationship with journalism. Chapter Two is entirely devoted to audiovisual translation, its history and main achievements. Chapter Three provides an overview on subtitling, its process and

the people involved. Chapter Four is entirely devoted to the analyses of my work in subtitling ranging from punctuation to the linguistics of subtitling. Finally, in Chapter Five, all the subtitles for the documentary are listed.

1.COMMUNICATING SCIENCE

"Why is it that nobody understands me, yet everybody likes me."

Albert Einstein

There have been many episodes in the history of science when scientist felt the urge to communicate their ideas to the public. For instance, during the Enlightenment period science became extremely fashionable. At one time, the height of chic was to hire a mathematician to come to your dinner party in order to entertain your guests and make their dinner more exciting (Wilson, 1998:3).

Nowadays, we live in an era of unprecedented scientific progress. Due to the growing impact of technology science is entering more and more in our daily lives. Moreover, the extraordinary development of mass communication systems gave the opportunity to scientists all around the world to speak up. What we have to keep in mind is that without a general awareness of science in the public domain, no scientific progress would have been possible. Thanks to science communication people learn about important developments that affect everyone.

That is why science achievements should or better must be brought into the public eye and especially to the attention of important stakeholders (Christensen, 2007:3).

One of the main problems of the scientific communicators is how to communicate scientific data in a correct way. It is all about explaining unfamiliar ideas and phenomena, but it is hard to find any systematic account on how this is done. They usually avoid equations, strive for clarity and use metaphors or analogies (Stocklmayer, Gore, and Bryant, 2001:49).

Increased public scientific awareness is extremely important. It benefits science itself, the individual citizens with directly applicable skills and knowledge and a society as a whole. For instance, especially the government and society benefit from more scientific literacy, since an informed electorate promotes a more effective democratic society. Moreover, it would be very difficult to reach new achievements and recruit new scientists without continuously informing the public (Christensen, 2007:4).

Scientist are used to communicate with their colleagues in a certain format. They begin with background information, then move to supporting details, and finally come to their results and conclusions. They cannot do the same thing with a non-scientific audience. On the contrary, they have to do the opposite or in other words "they must invert that pyramid and begin with the bottom line" and also add the "so what" question because people want to know why should they care (Sommerville and Hassol, 2011:49).

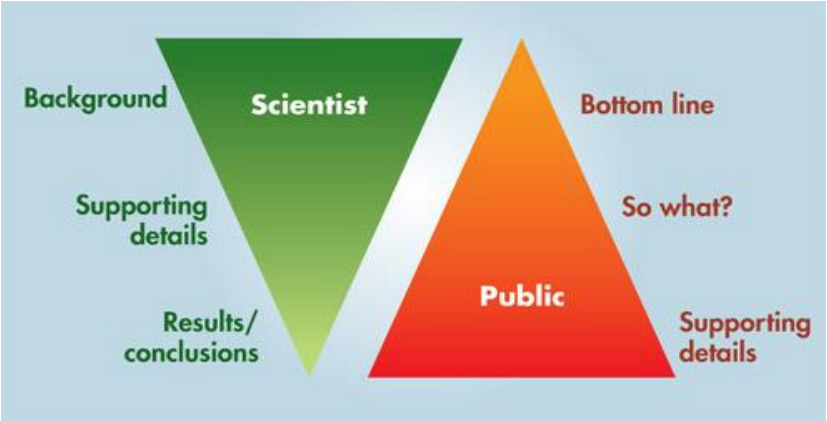


Figure1:Communication between scientist and communication between scientist and non-scientific audience (Sommerville and Hassol, 2011:49).

1.1 And what about Physics?

Although many of us are not familiar with important scientific discoveries almost all of us have experienced its technological applications that pervade our everyday life, the strategic choices of our countries and our imagination (Armeni et al. 2006:23).

As far as Europeans are concerned they see physics and medicine as the most "scientific" subjects, followed by biology, mathematics and astronomy. The interest that Europeans have about internet is quite surprising (29%). This application is seen as a very useful technological product but also as a mean able to increase knowledge and its diffusion. Furthermore, the interest differs according to socio-demographic characteristics: the Internet, space explorations and nanotechnologies mainly attract young males who are still studying, while medicine interests especially women and persons aged over 55 (Armeni et al. 2006:25).

Thanks to the comparison between the data furnished by the Eurobarometers of 2001 and 2005 we can notice a considerable increase of interest in physics. While astronomy placed first nanotechnologies did not catch much attention although their score doubled since 2001 (from 4% till 9%) (Armeni et al, 2006:27).

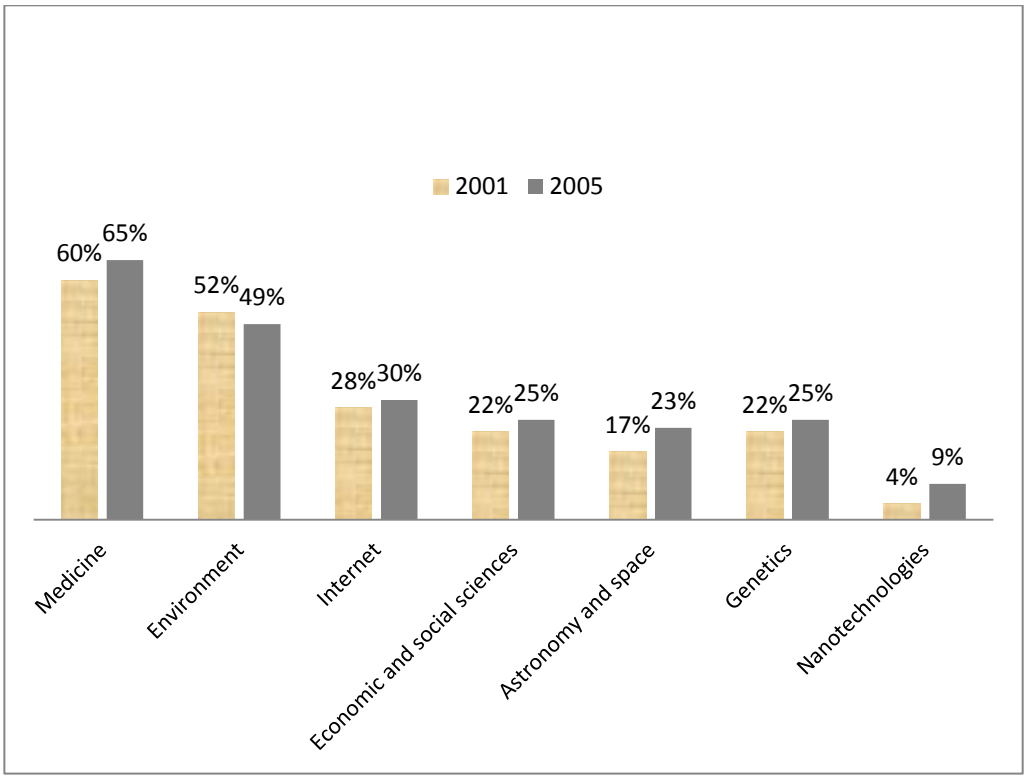


Figure 2: The scientific and technological developments of greatest interest according to Europeans: 2001-2005 comparison.

As we can see from the graphic below medicine placed first, followed by environment and Internet.

As far as the expectations of Italians they are focused on: the discovery of clean and unlimited energy sources, the use of intelligent robots for domestic work and the first manned expedition to Mars. And even in this case the preferences are associated with gender (women have greater expectations in cancer defeat, men in energy innovations), age (younger people prefer creation of intelligent robots or Mars expeditions), and education (the higher educated are more interested in

energy sources, the lower educated are interested in advances in medicine.) (Armeni et al. 2006:27).

Another important question is: how much do we know physics? According to Eurobarometer's data we can affirm that Europeans have a quite good knowledge of science. Some respondents were asked to decide if some scientific statements were true or false. The results were quite good: 66% answered correctly to the statements about physics, chemistry and medicine. Moreover, the country which citizens proved most prepared was Sweden, Cyprus had the lowest scientific knowledge while Italy occupied a central position. It is also true that "the Nordic countries" have a better scientific knowledge than numerous countries of Eastern Europe. The respondents with the best scientific knowledge are predominantly male, aged under 55, and are students or managers. However, comparing the 2005 and 2001 results we can affirm that the knowledge about physics among Europeans is increasing. Furthermore, the knowledge about "macroscopic physics" is much higher than the knowledge about "microscopic physics" (Armeni et al. 2006:31-32).

How is the image of physics conveyed to the public? Nowadays researches and scientist communicate with the public more and more in first person. Their main goal is to make the public more aware of science so that they could support it more willingly. One of the best ways to attract audience are popular physics books. These books use elements tied to imagination and fiction in order to explain complex theories in a more simple way. One of the examples could be the use of a time machine to explain the Einstein's theory of relativity. Thanks to the use of imagination physics is freed by the restraints imposed upon it by technology (Armeni et al. 2006:35).

The difficulty that women encounter when trying to make it or just trying to achieve important positions in the world of research and innovation are well-known worldwide. This problem is also present in this sector. The very president of the University of Harvard thinks that women are not keen to technical-scientific abilities as men. The first assumptions were that these differences are being formed at a young age by socialization and schooling. However, recent survey of young Italians aged 15 and 19 don't confirm these thesis. In fact, both boys (61%) and girls (49%) don't agree with the fact that males have a better attitude for science. Moreover, the majority of them don't think that schooling is responsible for the reinforcement of gender differences (Armeni et al. 2006:38).

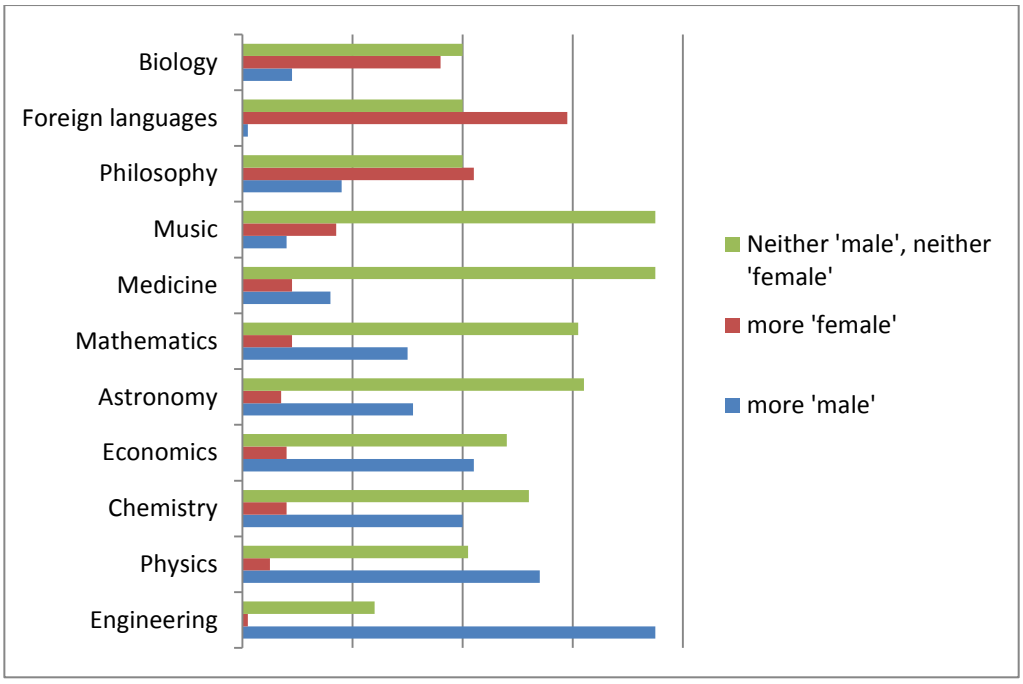


Figure 3 The perception of selected subjects as 'male' ore 'female' among young Italians aged between 15 and 19.

As we can see from the graphic above there are some subjects seen as predominately 'male' or 'female'. For instance, on one hand, foreign languages are definitely seen as more 'female' while on the other hand engineering is definitely seen as more 'male'. For all the rest, the 'neither 'male' or 'female'

prevails. Finally, greater attention must be put on the dynamics and factors responsible for current perceptions of science and of scientific careers.

Learning has to do with three principal perspectives: "the cognitive perspective considers the way learners make sense of scientific information as well as the intellectual consistency and value of the information. The affective perspective documents the way learners feel about their knowledge – the feelings that influence their learning of science. And finally, the conative perspective considers the usefulness of scientific information in meeting learners' practical and everyday needs." (Armeni et al. 2006:43) In the public perception of physics the emotional involvement is of crucial importance. In fact, the affective dimension may change the persons capacity for cognitive learning, and the same happens as far as the conative dimension is concerned: it could influence the learner's motivation. Alsop tested the validity of this model on the residents of the rural village in Somerset where high levels of radon contamination had been recorded. For most of them the affective and conative aspects were more important. For instance, those of them who were afraid of the consequences of the gas and thought they could not do anything to change their situation preferred not to know too much while those of them who thought they could do something to reduce emissions or the contamination of their homes wanted to know as much as possible (Armeni et al. 2006:44).

As far as nanotechnologies are concerned this is a recent sector about which still little is known. This does not mean that citizens do not develop attitudes towards these new technologies. On the contrary, they do develop attitudes thanks to ideological predispositions or mass media. A survey made in 2004 on a sample of 706 US citizens highlighted an interaction between emotions and knowledge.

Indeed: “When there were strong negative attitudes towards new technologies, an increase in specific knowledge had only slight effects, increasing support for nanotechnology and the perception that it had more benefits than risks. When there was low emotional negativity, the effect of knowledge was much more powerful, although it operated in the same direction as before (more knowledge, more support and a more positive perception of nanotechnologies)” (Armeni et al. 2006: 47). So the ‘knowledge deficit’ model which says that people with more knowledge seek for more information and are more open towards new technologies does not apply always. In fact the deficit model was usually used in early science communication. Its theory was that the public does not know much about science because of the lack of information. The scientist thought that the best way to solve the problem is to give the audience all the information needed. What they did not keep in mind is that the public will not be interested in information without context. (V Ellis, 2013) In this case we cannot take it into consideration because the person is overwhelmed by emotions.

	Not hopeful	**Only a little hopeful**	**Somewhat hopeful**	**Very hopeful**
Low knowledge	26,5%	10,7%	36,2%	26,6%
High knowledge	13,4%	5,8%	36,3%	44,4%

Figure 4 Feeling hopeful in nanotechnologies by level of knowledge

As we can see from the graphic above the more they know the more hopeful they are (Armeni et al, 2006:50).

1.2 Science and journalism

Science has an uneasy relationship with journalism. Journalist want an extraordinary story to tell while scientists want to communicate their ideas to the world. In science not everything is always about or not about to happen: for example some theories such as those of dark matter or dark energy are only assumptions. In this case we can't talk about something truth or false, only time a good research will give us the answer.

A valid scientific source is very important. The opinion of the scientists, in this case, would be of crucial importance. However, this not always happens. Journalists are independent and nobody can force them to write what they don't won't to write or on the contrary, nobody can hold their pen in order to write what they want.

We all know that moderation is not what makes news. Journalist won't make a living reporting that "nothing is wrong". That is why they usually prefer the "extremist". The former are used to make a good story, but they should be only used if the end result is an accurate and balanced story (Friedman et al. 1986:100).

Accuracy is very important for scientists. Sometimes they spend a lifetime in order to reach their goals and that is why, when the time comes to make them public, the accuracy of the person responsible of reporting those ideas is inevitable. Inaccuracy infuriates scientists but this is not the only reason why it should not occur: it could also have dangerous and far-reaching effects. For instance, a journalist must be very careful when speaking about "cancer cures", a misleading story could give false hopes to millions of people. And why? Just to

sell more copies? That is why there should not be disagreement about accuracy between scientists and journalists but there has to be discussion about what constitutes accuracy. When you spend a lifetime and put all of your energies in a project once you have reached your goal you want the world to know exactly how you have done it. On the one hand, in many cases, scientist want to see a full discussion of their work, including details and background information. On the other, journalists who have to deal with space problems or deadlines may have to sacrifice some details and emphasize some striking aspects of the story. So the story repeats itself: journalists have to satisfy the readers. Their main problem is to sell newspapers and catch the interest of the public. They must remember that good science writers are does who can satisfy both editors and readers. When it comes to scientists they should understand the problems the journalists face and try to work with them in order to have a story that is both accurate and readable. It is probably true that journalists and scientists, in some way, live in their own world and see the world from their own perspectives (Friedman et al. 1986: 106).

Details, of course, are of crucial importance. Firstly, details are important in order to understand how important conclusions were reached. But how should a journalist know when to stop? A journalist has to understand what a fact meant, how important it was, and that it should not be presented more or less important than it was.

We all know that journals such as *Donna Moderna* or perhaps *Le scienze* have a different audience. The readers of *Le science* could feel cheated if they do not get enough information: a more technical readership needs and deserves more detail. On the other hand, readers of *Donna Moderna* are not interested in long explanations of the scientific data. In fact, less sophisticated readers may not be

able to follow anything more complex than the basic steps of the research project. This is a reason why the kind of medium is very important. What journalist must keep in mind is that their main goal is communication. Therefore, if communication is to be considered effective the needs and the abilities of the audience must be considered. Moreover, journalist must do "their own homework": they must understand the content within which the facts lie. This is the only way to produce a good story (Friedman et al. 1986: 109).

2. AUDIOVISUAL TRANSLATION

Until recently, the Audiovisual Translation (AVT) has been neglected by Translation Studies scholars for many years. Until recent times translation experts mostly centered their on the differences between dubbing and subtitling and whether the former was better than the latter. However, now we can affirm that the situation changed drastically and that more and more experts are being interested in exploring this area. AVT is actually one of the fastest growing area in the field of Translation studies (TS). Due to the unprecedented surge in interest in TS, the AVT is experiencing the expansion and consolidation as an academic discipline (Diaz Cintas, 2008:1). Therefore, academic research has started in this field and a wide amount of works concerning audiovisual translation have been published all around the world.

One of the main reasons why this area has been almost fully ignored was the thought that AVT was not really a translation. They preferred referring to it as an adaptation because of its spatial and temporal limits that were imposed by the medium itself. Because of its use of two codes, image and sound, it must respect the synchrony in these new translation parameters. Therefore, the experts were searching for a perfect generic term that can include all the different manifestations we find in the audiovisual ambit. They think that, nowadays,

translation should be understood in a more flexible way. We should abandon all those outdated notions coined centuries ago, when the cinema, the television and the computer had not been yet invented (Diaz Cintas and Remael, 2006:9-11). Effectively, AVT and technology go hand in hand: developments in the latter will irremediably have the effect on the former (Sanderson, 2005:24). The adjectives such as "constrained" and "subordinate" were very often used when referring to these kind of texts. However, they began receiving criticisms for their negative connotation. That is why there was a need for a more appropriate term. It was, in fact, then that the term " audiovisual translation", or AVT, appeared. Moreover, this was not the only term used to refer to this field. Terms such as "film translation" or "cinema translation" were often used, even thought they were restricting because this kind of activity takes into account also other types of programmes (sitcoms, documentaries, cartoons, ect.) A term that could be a good alternative to the ATV term is "screen translation", because it refers to all products distributed on screen. However, AVT gained ground in the recent years and it is fast becoming the standard referent (Diaz Cintas and Remael, 2006:12).

2.1 Audiovisual Translation

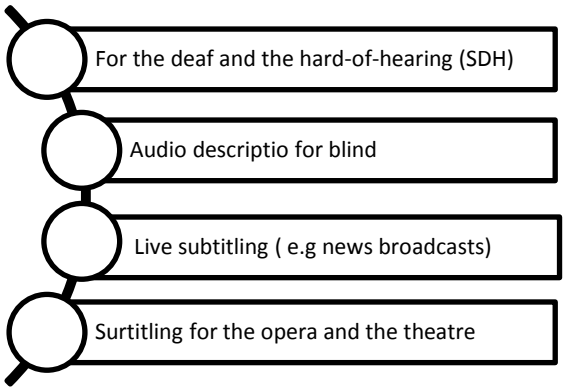
According to Diaz and Cintas: "Audiovisual translation refers to the translation of products in which the verbal dimension is supplemented by elements in other media" (Diaz Cintas and Remael, 2006:13). The two authors recommend three possibilities: 1) the message is conveyed only auditorily as, for instance, in songs

and radio programmes, 2) the only channel used is the visual one, as for example, comic strips, published advertisements, etc. or 3) both auditory and visual channels convey the message as in products such as films, CD-ROMs or documentaries. Due to all of these elements, AVT is considered much different from the literary translation.

2.2 Subdivision of Audiovisual Translation

There are two types of audiovisual translation: the intralingual and the interlingual audiovisual translation.

1) **Intralingual Audiovisual Translation**



In this kind of translation source language is the same as the target language and involves a shift from oral to written language. It usually has the same author, who uses paraphrases to explain the text in different words. In this type of translation the target text can be created at almost the same time as the original. Moreover, it is also true that intralingual translation is much shorter than the interlingual translation.

The **SDH** is one kind of intralingual translation that is developing most at present. They are meant for people with hearing problems and are prepared specifically for this target group. In most European countries they are transmitted via teletext. This type of subtitles usually change color on television depending on the person who is speaking. Furthermore, they can also give us some paralingustic information that those people cannot access from the soundtrack such as the irony of the statement or a knock on the door (Baker and Saldanha, 2009:15). Due to new legislation in many countries tv channels are obliged to broadcast a certain percentage of their programmes with this kind of subtitles. For instance the BBC (British Broadcasting Corporation) made a huge progress in this area: in 2008, it managed to subtitle a 100% of their programmes with the SDH (Diaz Cintas and Ramael, 2006:5).

The second type of intralingual translation is **audio description for the** visual elements of an audiovisual product (including films, television programmes, documentaries, advertisements, but also such audiovisual phenomena as art galleries, museums, dance performances, city tours, live events, etc.) This is some kind of an additional narrative that fits between the original dialogue and describes everything that is seen in the film or on the stage. It also includes

descriptions of actions, facial expressions, clothing and scenery and helps the blind to understand the plot of the story (Diaz Cintas and Ramael, 2006:6).

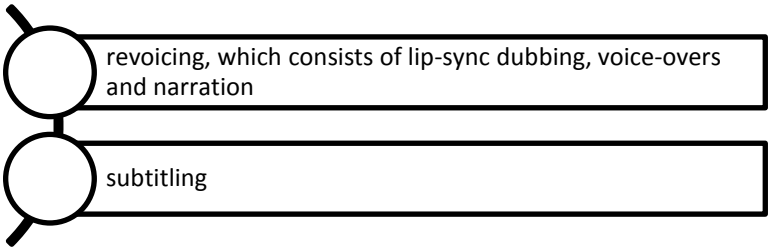
A third type of intralingual translation is **live subtitling**, or sometimes called respeaking. This kind of subtitling often needs some technical support because it is carried out for life broadcastas (e.g sporting events or tv news). That is why special keyboards are being used: they allow the typist to press two or more keys at the same time or perhaps to write syllables and instead of single letters. Moreover, they also use voice recognition software: the subtitler repeates what he sees on screen and the software "translates" that utterance into written lines (Cintas and Ramael, 2006:7).

The fourth type of intralingual audiovisual translation is **surtitling for the opera and the cinema**. These kind of subtitles are often used during musical performances or the opera. Usually, they consist in the translated or transcribed lyrics projected above the scene. They may be used either to translate the meaning of the lyrics to the audience's language, or to transcribe lyrics that may be difficult to understand in the sung form. In general, they are displayed using a supertitling machine (Diaz Cintas and Ramael, 2006: 9).

Surtitling for theatre follows the same principles as subtitling for television. The only exception is the speed of the surtitles. As the audience have to move their gaze a great distance from the actors to the display above the stage, the surtitles have to be even slower than subtitles in a film (Diaz Cintas and Ramael, 2006:10).

2) Interlingual Audiovisual Translation

Interlingual translation can be defined as the replacement of elements of one language, the domain of translation, by equivalent elements of another language, the range of translation.



The first type of interlingual audiovisual translation is **voice over**. "It is the term used to refer to the audiovisual language transfer methods of dubbing, narration and free commentary collectively, and describes the attempt to cover (partly or entirely) the spoken source text of an original audiovisual production by a new spoken target" (Karamitroglou, 2000: 5)

Dubbing covers entirely the spoken source text with the target text and that is why it is also called lip-sync dubbing. It fits the lip movements of the original. On the contrary, voice-overs does not emphasize the lip movements of the original

text nor the faithfulness of the translation. It is a free interpretation of the source language in the target language. Sometimes it is enriched with some elements not present in the source texts, such as journalistic comments (Karamitroglou, 2000:5).

The second type of interlingual translation is **subtitling**. "Subtitling can be defined as the translation of the spoken (or written) source text of an audiovisual product into written target text which is added onto the images of the original product, usually at the bottom of the screen" (Karamitroglou, 2000: 5). Subtitling con be both intralingual and interlingual. Moreover, it can be open, when the target text constitutes a physical part of a translated film or closed when a target text is stored in another format, for instance teletext and therefore not a part of the film.

2.3 Interlingual Audiovisual Translation in the past

Even during the silent film area it was very important to convey to the viewers the dialogue of the actors on screen. This problem was solved by the now call intertitles: the predecessors of the subtitles. They were texts, printed on paper and placed between the sequences of the film. Their first appearance was in 1903 as descriptive titles in Edwin S. Porter's Uncle Tom's Cabin. Translating such dialogues was quite easy: the original titles were removed, translated, filmed an re-inserted. Alternatively, a translator used to give a simultaneous translation to the audience. The very first sub-titles first appeared in 1909. In fact, M. N. Topp registered a patent for "device for the rapid showing of titles for moving pictures other

than those on the film strip" (Ivarsson, 2004:1). By using some kind of a slide projector, subtitles were shown on screen below the intertitles.

With the invention of sound films another problem emerged: how to translate the dialogues of the actors? What they started to do was the so-called multilingual filming. Therefore, the film was shot several times in different languages, more precisely in English, German, Italian and French. However this technique had to be abandoned soon (Ivarsson, 2004:1).

2.3.1 History of subtitling

With the invention of sound films, in 1927, the viewers could hear the actors and that is why the titles between the sequences of the film were removed. The producers decided to replace intertitles with subtitles and inserted them directly into the picture. This technique was quite cheap (much cheaper than dubbing) and became of common use in countries like Netherlands. "The first attested showing of a sound film with subtitles was when The Jazz Singer (originally released in the US in October 1927) opened in Paris, on January 26, 1929, with subtitles in French. Later that year, Italy followed suit, and on August 17, 1929, another Al Jolson film, The Singing Fool, opened in Copenhagen, fitted with Danish subtitles." (Ivarsson, 2004: 2)

New techniques were emerging in order to improve the quality of the final result. **The optical method** was the next step. They tried to copy the photographed titles directly on the film copy. However, the original film negative was usually not available so they had to re-copy the whole film in order to obtain a new negative.

That is why there was a "consequent loss of focus and substantial increase in the noise level." (Ivarsson, 2004:3)

The mechanical and thermal process were not efficient either. In 1930, Leif Eriksen, stamped the titles directly on the images of the film strip. What he did first was to moisten the emulsion layer to soften it. Then he proceeded by typesetting the titles, printing them on paper and photographing them in order to produce very small letterpress type plates for each subtitle. In 1935, O. Turchányi, heated the plates to a very high temperature in order to melt away the emulsion on the film without the need for a softening bath. However, both these processes had bad results with poorly defined letters (Ivarsson, 2004:3).

The chemical process was patented in 1932 by R. Hruska. He invented a new method for impressing the titles directly on the film. What he did was to apply e thin coating of wax or perhaps paraffin to the emulsion side of the finished film copy. The printing plates were placed in a printing press and the plate was fed and heated to a temperature of nearly a hundred degrees and one by one pressed against the paraffin coating at the bottom of the frame which corresponded to the beginning of the dialogue line. The paraffin under the letters melted and was displaced, exposing the emulsion. This process was repeated with all the frames on which this subtitle was to appear, corresponding to the duration of the speech. After the printing process the film was put through a bleach bath, which dissolved the exposed emulsion, leaving only the transparent nitrate or acetate film. The etching fluid and the paraffin were then washed away. This process produced clearly legible white letters on the screen. Later on, this process too was automated by means of a counter, which fed the plates forward, counted the frames on the roll and ensured that the subtitles came in the right place and were

of the right length. This kind of process is still used in many countries (Ivarsson, 2004:4).

The laser subtitling was the most efficient development in this field. Thanks to this method typesetting and plates became unnecessary. A computer controls a laser beam, and it takes less than a second to write a subtitle of two lines. Laser method is the cheapest method but requires a very good equipment (Ivarsson, 2004:5).

However, **subtitling for television** was something different. The experts realized very soon that the prints used for the cinema caused a number of problems. The picture of a tv set has a narrower contrast range than that on a cinema screen and the subtitles were almost illegible. Furthermore, the ability of the audience to read subtitles on a TV screen is much slower than on a cinema screen. The first subtitled tv film was the German full-feature film *Der Student von Prague* broadcast by the BBC in 1931 (Ivarsson, 2004:5).

The making of the subtitles was done by separate people. Firstly, the spotting was done by a technician who had no knowledge of the source language. Indeed, he just marked the in times and out times of every utterance into a dialogue list. Secondly, these time were converted to a specific number of characters. Afterwards, a translator had to fit his translation in this limited space and usually he didn't even see the film. Later on a technician had to type the subtitles onto the type plates and some years later onto computer disks from which they were transferred to the film. The final result was usually full of errors. From the 1980s the things changed drastically. Translators were able to do all the work on their own thanks to advances in computer technology and new subtitling programmes.

Timing, translation and revision were done by the same person and that is why the possibility to make a lot of errors decreased (Ivarsson, 2004:7).

2.3.2 History of dubbing

The history of dubbing differs from the history of subtitling and it varies from one country to another. This method of audiovisual translation first appeared in The United States although it has been used mainly in Europe, where it appeared in 1936.

However, the first dubbing attempts started in the late 1930s. The quality of these films was quite poor. Moreover, it was only one person who dubbed all the characters of the film and it was usually the translator himself. Some years later, several people started to perform postsynchronisation. The quality of the final work did not change: the dialogues sounded unnatural, the text was synchronized very badly, the performance of the actors was rather poor and as a whole it was acoustically very badly done.

The next evolution in this field of audiovisual translation was **live dubbing**. In this case the dubbing actors were the same as the actors of the film. The main problem of this technique of dubbing was that it was broadcast live and so the actors had no possibility of changing their version and the number of translation errors was usually very high. Moreover, they had to take turns using only one chair and only one pair of earphones. All the noise they made such as coughing, moving the chair, putting the earphones on and off, their steps was heard in the dubbing. The quality of these films was very low.

In 1964 the era of **loop dubbing** started. In this case the whole film is divided in several parts or loops, all the actors are present an they dub the film until the film director is satisfied. This method definitely has a better quality than the previous but it is very time-consuming.

Another method appeared in 1990s. It was the **unilinear dubbing**. We have only one actor dubbing his character from the beginning to the end until his film director is not satisfied. In fact, in this case, if the film director is not satisfied they have to repeat only the part where the mistake was done. The unilinear dubbing is faster and cheaper than the loop dubbing. Indeed, it is now preferred by an overwhelming majority of dubbing studios (Gilbert et al, 2009:22).

2.4 Interlingual translation in present-day Europe

We do not have a complete overview of the spread and the impact of the screen translation in Europe. However, there is one main distinction: the preference of the European countries for dubbing or subtitling. On the one hand, we have the UK, Benelux, Scandinavian countries, Greece and Portugal, which are mainly "subtitling nations", and on the other, the central and southern European countries, such as Germany, Spain, France, Italy, Austria that are mainly "dubbing countries". Countries such as Czech Republic Slovakia and Hungary use both subtitling and dubbing, the former for cinema, the latter for television. The reason for dubbing, in some countries was because of the proportion of their market so that the expensive production of dubbing could be profitable. Furthermore, there

are some political and social reasons why some nations prefer the one or the other. For instance, countries such as Italy and Germany first started using dubbing in 1930s, especially for political reasons. In fact, they wanted to protect and exalt national languages and in this way they also controlled the content of what was being screened. On the contrary, a preference towards subtitling, for instance, in Scandinavia nations was the proof of its more open attitude towards other cultures and languages. It is also due to its restrictive number of spectators that countries such as Scandinavian prefer subtitling: subtitling cost the tenth or the twentieth less than dubbing (Koolstra et al, 2002: 324).

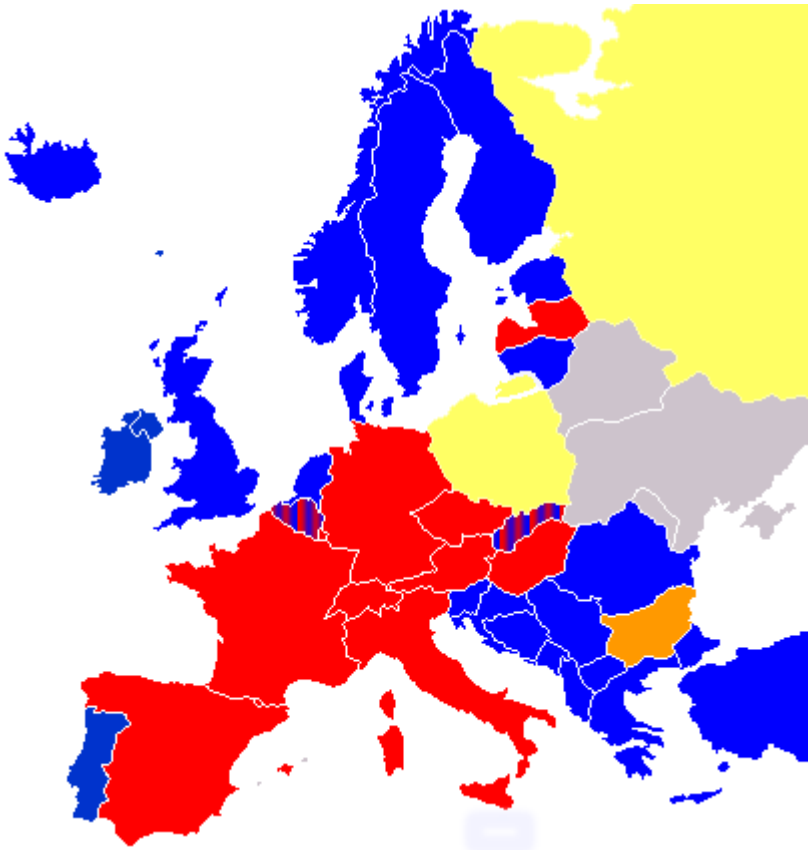


Figure 1 European countries and their common methods to dub films

The countries in blue dub only for children, the rest of the programmes are subtitled. The countries in orange are the so called mixed areas: they are using occasionally full-cast dubbing otherwise solely subtitles. The countries in yellow adopt the voice-over technique. The countries in red are countries that use only the dubbing method. The blue-red countries occasionally produce own dubbings but generally use dubbing versions of other countries since their languages are quite similar to each other and the audience is also able to understand it without any problems (for instance Belgium and Slovakia).

The screen translation map is not as well-defined as it seems. For example, it is true, that subtitling is preferred in countries with small population but political entities such as Wales or Catalonia opt for dubbing as a way of promoting a minority language. Besides, traditionally subtitling countries prefer to dub children's films and programmes. Moreover, countries such as Greece and Denmark now also dub for audiences other than children. In English-speaking countries there is also a new tendency to subtitle the few foreign language films that enter these markets (Koolstra et al, 2002: 325).

2.4.1 The pros and cons of dubbing and subtitling

The two methods mentioned above are the most prevalent methods used in most countries worldwide. Both of these adaptions have its advantages and disadvantages. However, it is important to stress that neither of them is better than

the other: not only the translators, but also the viewers are accustomed to the method that is used in their country.

On the one hand, the main reason why one country chooses to dub its programmes is because they think it is easier to follow a story if they do not have to read while viewing. On the other hand, countries that choose the subtitling method claim that this way of adaptation is more natural and realistic because does not intact the voices of the actors. However, these often-heard arguments are definitely not the only one. Subtiling and dubbing have different information processing, the relation with images and learning effects.

a. Information processing

Neither of the two methods cannot translate the original text literally and that is why sometimes there are problems with the information transfer.

As far as subtitling is concerned there is a need for condensation. In fact, the space and time limits imposed by the medium make the translators life hard when they have to decide what to omit and how to do it. On one hand, they have to be concise and on the other the subtitles must have an equal informational value as the original text (Koolstra et al, 2002:327).

As far as dubbing is concerned, we have some speech duration problems. For instance, sometimes happen that in the source language one meaning is spelled out with only one word while in the target language that meaning has to be spelled out with more words and vice versa (Koolstra et al, 2002:328).

In special cases, subtitles are shown in the same language as the original spoken text (usually for the hard-of-hearing using the teletext page). In this case sometimes there can be cases of redundancy between what has been said and what the readers can read from the subtitles. Moreover, the same thing can happen also while watching a foreign film with our own language subtitles. In fact, thanks to the linguistic affinity, school learning or experience most viewers have a very good knowledge of foreign languages, especially English (Koolstra et al, 2002:329).

On the contrary, dubbing does not have problems with redundancy because the original spoken text is entirely removed. However, that is why this method of audiovisual translation is more vulnerable to manipulation and censorship (Koolstra et al, 2002:330).

Dubbing has a very easy adaptation. For example, if a translator has to substitute an untranslatable joke there are no problems, because the viewers will not notice it. On the contrary, if the same thing had to be done with the subtitled film viewers could notice that some changes have been done (Koolstra et al, 2002:331).

Subtitling reduces the area of the original picture and also distract the viewer's attention away from the screen. However, a research made by Gielen in 2008 also proved that viewers that are used to watch programmes with subtitles adopt a technique in which the eye is focused primarily on the area just above the subtitle so that they do not miss much of what is happening on the screen nor they have difficulties in reading the subtitles (Koolstra et al, 2002:331).

Dubbing is easier to follow. In fact, often viewers combine television viewing with another activity, perhaps reading. The same thing could be done also with subtitling but is not as easy as it could seem because usually viewers do not have a very good knowledge of the foreign language (Koolstra et al, 2002:332).

Watching films with subtitles rather than with the dubbing method is much easier if the sound of the television is overwhelmed by other sounds. In the former we can simply read the subtitles and the problem is solved, in the latter that is not possible and the loss of information is inevitable (Koolstra et al, 2002:332).

Watching films with subtitles also requires more mental effort because a person has the concentrate on both what is happening on the screen and what is written in the subtitles. On the contrary, listening to spoken texts is evidently not very demanding mentally, because viewers do not need to be reading at the same time (Koolstra et al, 2002:332).

Moreover as far as efficiency in information processing is concerned it seems smarter to read subtitles because reading is usually faster than listening. In a research made by Mangnus et al. in 1994 emerged that adults recalled equal information from the subtitling and the dubbing programme. On the contrary, as far as children are concerned they had some difficulties with the subtitling programmes (Koolstra et al, 2002:333).

b. Images and subtitling

Usually domestic programmes are more popular than foreign products. However, this does not mean that dubbed programmes are seen as less attractive just because of the adaption.

Subtitling programme is seen as more real because the original spoken text is intact. On the contrary, in dubbed programmes the original spoken text is entirely removed. In fact, dubbing is often criticized because popular actor's voices are known worldwide and that is why these kind of films sound less real than subtitling programmes (Koolstra et al, 2002:335).

As far as the familiarity is concerned dubbed programmes may seem more familiar than the subtitling programmes. Viewers can identify more easily with the actors and they also may think that everything that happens on the screen is more normal just because the actors speak in their own language (Koolstra et al, 2002: 336).

One important disadvantage as far as film producers are concerned is that subtitles overlap the picture. Film producers work hard in order to present aesthetically attractive images and that is why the criticize this adaption method (Koolstra et al, 2002: 336).

Another disadvantage of subtitling is the fact that the artistic unity of picture and sound is not respected. This cause the viewer's attention to split. On the contrary, this is definitely not the case of dubbing programmes (Koolstra et al, 2002:337).

One of the disadvantages of the dubbing programmes is that due to lip synchronicity the translation work becomes even harder.

The translated sentence should begin when the speaker starts speaking and should end when the speaker is finished. Moreover, the sound of the spoken words should be congruent with the lips movement of the speaker. That is why sentences sometimes are shortened or lengthened and the choice of the words and the tempo must be adjusted to the lip movements. In the dubbing countries such as Italy or Germany the precision in this field is of great importance. However, Germany stays more faithful to the lip-synchronicity while Italy prefers paying more attention on the translation (Koolstra et al, 2002:338).

Subtitling programmes have translation problems too and they are caused by the space and time limits imposed by the medium. Translators have to put their translation in the two line subtitle and that is why sometimes the translation is not optimal. One of the ways to solve this problem with compound past tense words is to substitute them with simple past tense words (Koolstra et al, 2002:338).

c. Learning effects

While watching television viewers acquire information that the producers of the programmes wanted to convey. Nevertheless, watching television may also develop other skills that are not closely connected with the content of the programme.

Watching subtitled programmes implies reading. I still remember my mother reading the subtitles while me and my sister were listening and watching what was happening on the screen. At the age of 6 I was capable of reading the subtitles with almost no difficulty. My experience is only one of many that can testify that this kind of activity can improve children's reading skills.

When the viewers are watching the non-subtitling programmes (including the dubbed programmes) they are listening the actor's words and watching the pictures that support those words. In this way they also can acquire new vocabulary by watching the programmes in their own language. Rice and Woodsmall's study proved that children from three till five years old learn two to five new words after watching a 15-minute television programme. Moreover, children's listening to tv programmes can be compared with the children's listening to other people talk in everyday life (Koolstra et al, 2002: 341).

In subtitling programmes foreign language can be heard, in other words the original spoken language is intact. In this way people can here the actors speaking, for example in English and read the translation in the subtitles, for example in Dutch. In fact, more than one-third of Dutch adolescence are convinced that their foreign language knowledge benefits from watching subtitled programmes. Moreover, the majority of them is convinced that they are learning more by watching television or listening to the radio than at school. Series of studies conducted on students in Belgium proved that after watching a 15-minute cartoon in a foreign language with subtitles in their own language word meanings were learnt. It is interesting to underline that the languages used for this experiment were not only the most common foreign languages such as English or German; unfamiliar languages such as Chinese or Hungarian were used too. The

comparison between the familiar and unfamiliar languages showed that both type of languages were learnt equally well (Koolstra et al, 2002: 342).

Studies were conducted on children too. Children from Grades 4 and 6 watched a documentary about bears in tree versions: a) with English spoken text and Dutch subtitles b) In Dutch without subtitles c) with an English spoken text without subtitles. The results were surprising. They learned plenty of new words with the first method and they also managed to understand some words with the third method. These two studies proved that both adults and children can learn the meanings of foreign-language words just by watching a short part of a subtitled programme. Moreover, watching foreign-language subtitling programmes also improves the viewers' pronunciation (Koolstra et al, 2002: 342).

Even if the benefits of these subtitled programmes for language learning are extremely evident some people do not consider it a very good idea to broadcast these kind of programmes. These kind of people are the so-called language purist. In fact, they are afraid that subtitled programmes could contaminate their mother tongue. To prevent that, some local television such as the Basque channel in Spain prefers to dub the foreign programmes (Koolstra et al, 2002: 343).

As I have already said we cannot say which of these two methods is better. What every country should do is to choose the right type of adaptation for every foreign audiovisual product that she wants to broadcast.

2.5 Differences between literary and Audiovisual Translation

Subtitling and dubbing are certainly a form of translation. However there are some special characteristics that make them different from the translation of a written text.

When we are translating a book, the original source language is completely replaced with the target language. In other words, the text is transferred from one language to another. On the contrary, when a film is being translated the situation is quite different. Firstly, the message of the film is conveyed by various messages such as image, acting, sound and language. It is obvious that not all of them can be replaced. On the one hand, when a film is dubbed only the visual component stay completely the same while the auditory component is completely changed. On the other hand, when a film is subtitled both auditory and visual components remain; the actual translation is just added to the original work. Subtitling is different from other types of translations in several ways.

The translator of audiovisual products has a reduced scope. For instance, if there is something that has to be explained in a literary translation, the translator can use a footnote or include an explanation directly into the text. This is impossible in a film or a documentary.

Differently, specialized translators have to respect more strictly the content of the original text, producing a translation that has to be clear and comprehensible. Most of specialized texts are about scientific or technical topics; they aim to communicate a specific and informative content, so that the translator has to pay

attention to particular words or expressions. There is a strict relation with reality and the translator cannot translate following his personal interpretation. He has to know the specific terminology required for the particular translation and the subject of the text, considering also the target audience. There are types of texts that can be translated using both literary and specialized translation, such as the essay. The translator has to find the best strategies to reproduce the message of the original text, respecting the form and the specific terminology that makes every text a particular one.

2.6 Costs of various Audiovisual Translation types

Every audiovisual translation type has its costs. In fact, most countries adopt one of the two methods considering this important feature.

The costs for these type of translations can be divided in two groups: investment costs for equipment (also called capital costs) and labour costs influenced by time (also called operational costs).

The average cost of one hour of television programme subtitling in Europe is from € 700 TO € 1,500. On the contrary, lip-sync subbing of the same hour costs from € 12,000 to € 20,000. On the other hand, voice-over for the same period of time can be produced for about € 1,000. It is important to underline that these are only average amount and that they can vary from one country to another (from € 250 to € 1,957 for subtitling and from € 3,460 to € 24,000 for dubbing) (Luyken, 2006:141).

As we can see from the data below dubbing is approximately 15 times more expensive than subtitling. It takes much more time to dub a film and much more people are needed. This fact increases financial demand enormously. However, it is also true that the capital and equipment costs of subtitling and dubbing are almost the same (around 130,000) (Luyken, 2006:142).

Dubbing actors present themselves a huge cost: almost a 64 % of a total budget. Moreover, star actors are paid very high sums. As far as subtitling is concerned, equipment accounts for about 25 per cent of the overall budget. Interpreting labour accounts for about 60 per cent, lower than for dubbing, where the translation labour accounts for 64 per cent. Technical labour accounts for about 15 per cent of the total cost in both methods (Luyken, 2006:143).

It is obvious that the cost of subtitling and dubbing are closely connected to its quality. Therefore, if the whole process is done faster and fewer people are engaged than the cost can be significantly reduced. This especially the case of dubbing, while as far as subtitling is concerned nowadays we can find a lot of software that can be used also by non-professional subtitlers. Nevertheless, this is always at the expense of the quality of the overall product (Luyken, 2006:146).

2.6.1 The job of Audiovisual Translator

There is a substantial difference between a subtitler and a dubbing translator. The subtitlers do a complex job: spotting, translation and subtitle composition. They can be either permanent staff of subtitling studios or TV stations or they can be

free-lancers. The free-lancers are, however, usually used on a more or less regular basis. On the other hand, the dubbing translator only has to do a rough translation of the dialogue. He usually translates the script word by word, sometimes suggesting various possibilities of translation and then passes it on to the dubbing writers (or adaptors) who then compose a dubbing dialogue which is synchronous with the original one.

As far as the salary of the dubbing companies translators is concerned, they earn between € 80 and 145 per working day. In other words, about € 26,500 a year. On the other hand, the gross annual income of a subtitler in Western Europe is estimated at some € 34,000 per year (approximately €170 per working day) (Luyken, 2006: 148).

Until now, media translators have been of three kind: freelance translators, programme-makers with language skills and cinema translators. The European Broadcasting Union (EBU) claims that these professional figures are essential but not sufficient for high quality performance in future multilingual television. Therefore training for new media translators and further vocational training for existing media translators deserves high priority (Luyken, 2006:149).

3. SUBTITLING

3.1 Introduction to subtitling

Subtitling differs from other types of translations in many respects. Firstly, it does not only consist in translating a text from a source language to a target language but it also involves a shift from oral to written language. In other words, there is a shift from one semiotic system to another. This is the reason why Gottlieb called this kind of translation "diagonal translation" (Diaz Cintas, Remael, 2006:78)

The time available for the preparation of subtitles varies, as the following two types can be distinguished: pre-prepared subtitles and live or real-time subtitles. The differences between the two types are not so difficult to guess. The pre-prepared subtitles are made after the programme (documentary, film etc.) has been shot. In this way, the translator has all the time he needs to make a good translation. On the contrary, the real-time subtitles are made while the programme is taking place. This is a relatively new type, it is used in the case of live interviews, political statements etc. In this way the translator has to do his best in order to make a good translation even if the time to make it is not enough. Pre-prepared subtitles can also be divided according to their text density. Therefore, the first type is the subtitling in complete sentences. This is the most commonly used. The second type is the reduced variety: it is normally used when not all that has been said needs to be relayed as the audience can retrieve some information

from other sources in the film such as image, gesture or music. As far as live subtitles, they can also be divided into human-made and machine translated subtitles (Diaz Cintas, Remael, 2006:80).

From a technical perspective there are open subtitles and closed subtitles. Open subtitles cannot be removed or turned off because they are burned onto the image. Closed subtitles leave the choice up to the viewer who can decide whether he or she wants to see them or not (Diaz Cintas, Remael, 2006:80).

As far as the method of projecting subtitles is concerned two methods are being used today: laser subtitling and electronic subtitling. Firstly, laser subtitles are an integral part of the film copy because they are engraved on the image; in other words they cannot be removed. Thanks to its great precision this method allows viewer to get an excellent definition of letters. Conversely, electronic subtitles are not engraved on the image but they are superimposed on the screen. Thus subtitles can be projected onto or below the image, in any language, in any colour and -most importantly- without damaging the original copy (Diaz Cintas, Remael, 2006:82)

Subtitles can also be distinguished depending on the medium used for the distribution of the programme. In fact, the medium can affect the way subtitles are produced: subtitles for the cinema, television, VHS, DVD or the internet. For instance, cinema may use up to maximum of 40-41 characters since it is an accepted norm that a viewer can read more easily from cinema screens than from television screens. That is why one and the same film can sometimes have three or four subtitled versions: the one used originally for the cinema, the one for the DVD and finally one for television broadcasting. (Diaz Cintas, Remael, 2006: 84).

3.2 The subtitling process

The subtitling process usually starts when a client contacts the subtitling company with a commission. The client could be a distribution company, a television station, etc. In the first stage general details are discussed. First, the subtitling company has to watch the film to make sure that the copy is not damaged, decide the dialogue list and check if there is something else that needs translating too, (such as songs or inserts). If the dialogue list is missing it has to be transcribed from the soundtrack. Some companies only give translators the scenes that include dialogues leaving the rest in black (Diaz Cintas, Remael, 2006:90).

The next stage is spotting, also known as timing and cueing. It consists in deciding the precise moment when a subtitle should appear on screen (in-time) and when a subtitle should disappear from the screen (out-time). This is usually done by technicians who usually do not have a good knowledge of the language spoken in the film. A copy of the film and the dialogue is then sent to the translator. Moreover, translator sometimes work without having any access to the screen version of the film or from a soundtrack without a copy of the written text. This makes subtitling much more difficult. This occurs when clients are afraid that illegal copies will be made or perhaps when there are tight deadlines. Watching the whole film before translating it is very important to ensure a high quality translation, though it may not always be possible when deadlines are really tight. During the first viewing of the programme translators:

1. take notes of words and phrases that could prove problematic because they lend themselves to a polysemous reading. For example, the English word "*funny*" can have many different meanings.
2. take notes of gender and number of nouns, pronouns and adjectives that are not marked in English. For instance, the expression "*You're great*" can have different meanings depending on whether the addressee is male or female, or whether speakers are polite or informal.
3. decide on the formality or the informality of the pronouns used depending on the context.
4. establish whether deictics such as "*this/these*" have referents on the screen. If they do it is sometimes unnecessary to translate them
5. identify exclamations with no fixed meanings such as "*oh,my*" or "*Christ*" which may be understood only in some contexts.

In the third stage the translator can start translating the text from the source to the target language. Once the translation is over it is sent to the client. Nowadays translators mainly send their work by e-mail (Diaz Cintas, Remael, 2006:98).

The translator was not asked to produce the actual subtitles, but rather the text translation, the translation undergoes an adaptation process. Due to the constraints imposed by the medium a technician or adaptor has to adjust the translation to an appropriate subtitling length. A revision and proofreading of the subtitles follows. Ideally, a different person should be responsible for this task, even if it does not happen all the time. All mistakes need correcting, because spelling mistakes for example are more easily spotted on the screen and could be irritating for the viewer. Before inserting the subtitles on the celluloid a simulation of what the film is going to be like it is carried out in the clients presence. At this stage, changes

can still be made on the client's request. Once the subtitling company's work is approved the next stage consists in laser engraving the subtitles on the celluloid. This method is normally used for cinema subtitling. Electronic subtitling is used for events like film festivals because it is cheaper. Once subtitling is over, the film is then sent to the client, who can screen it on the cinema or perhaps broadcast it on television (Diaz Cintas, Remael, 2006:100).

3.3 Professionals in the subtitling process

There are three different kinds of professionals in the subtitling process:

1. The spotter who also known as subtitler. Spotters are responsible of deciding the in and out times of the subtitles. They usually know the language of the original film or programme but may not know any other foreign language. On the other hand, they are conversant with film language and shot changes.
2. The translator, is in charge of the target language version of the film or programme. Translators need to have a very good knowledge of the source and the target language. They also have to be experts in the semiotics of subtitling.
3. The adaptors are the experts in subtitling translation. They must fit the translation into the subtitling lines searching for synonyms and altering syntactical structures without sacrificing the meaning of the original. Sometimes they do not have no knowledge of the source language.

This tripartite division does not reflect the real situation in the subtitling world. Firstly, neither the spotter or the adapter are required to have a good knowledge of the language of the audiovisual programme. This could affect the quality of the final film or programme. Adaptors are gradually disappearing and being substituted by translators. Moreover, many subtitlers carry out both, translation and adaptation. Therefore, the more versatile the professional is, the more chances of securing different jobs. However, in some companies the distinction between spotters/subtitlers and translators may be as relevant as it was in the past (Diaz Cintas, Remael, 2006:103).

3.4 Technical considerations

3.4.1 Dialogue list and style guide

A dialogue list is a key document that makes the work easier. Although dialogue lists are essential to produce high quality subtitles they are not very common in the profession. Students attending subtitling courses usually work directly from the soundtrack alone in order to improve their skills.

In addition to the dialogue list style guides are provided by subtitling companies to give all the parameters needed during subtitling (Diaz Cintas, Remael, 2006:120).

3.4.2 Spatial dimensions and maximum number of lines

Generally speaking, subtitling is limited to two lines. However, subtitling for the hard of hearing often makes use of three or even four lines and bilingual subtitling may also have four-lines subtitles.

The standard position for subtitles is horizontal at the bottom of the screen because this part of the screen is usually less important for the action. However, one-line subtitles are sometimes needed to allow the viewers to see most of the film images. In this case some companies prefer using the first (or top line) while others prefer the second line. Nowadays, subtitling companies prefer using the second line to keep the image clean.

Subtitles can be moved from the bottom of the screen to another position if: the background at the bottom of the screen is too light; some important action is taken at the bottom of the screen; some important data are displaced at the bottom of the screen (Diaz Cintas, Remael, 2006:125).

3.4.3 Characters per line

The maximum number of characters can vary depending on guidelines or software used by the subtitling company. A one line TV subtitle is usually 37, including blank spaces and typographical signs, that also take up one space. However, sometimes clients might ask for a maximum of 33 to 35 characters per line, or

allow up to 39 to 41 characters. Only in film festivals is a maximum of 43 characters per line allowed, while for the cinema and DVD a maximum of 40 characters is allowed. Subtitlers get instructions from their clients, so once the number is known the programme takes care of counting.

There is no fixed number as far as the minimum of characters are concerned. However, subtitles with less than 5 characters are rare. Any subtitle should stay on screen for at least one second so that the eye of the viewer could see and read it (Cintas, Remael, 2006:127).

3.4.4 One-liners and two-liners

The general rule is that if a short subtitle can fit into one line, there is no reason to use two. Indeed, there is no need to make the eye run from one line to another when all the information can be presented in a single line that viewers can read in a glance. Moreover, whether they are one-liners or two-liners, subtitles should always have the same height on the screen. Viewers will get used to it and have less difficulty in reading the subtitles and looking at the image. With two-liners, it is better to keep the top liner shorter, even if this is not a general rule and may not always be possible (Diaz Cintas, Remael, 2006:130).

3.5 Temporal dimension

3.5.1 Spotting and duration of subtitles

Spotting has to keep pace -temporal synchrony- with the utterances. This means that a subtitle should appear when a person starts speaking, and should disappear when the person stops speaking. The exacts cues are defined in hours, minutes seconds and frames. Studies indicate that if a subtitle stays on screen longer then the time the viewer actually needs to read it, there is a tendency to read it again. In order to avoid this, six seconds is the recommended maximum exposure time to keep a full two-liner. Therefore, if we are spotting a very long dialogue we should split it up rather than making a very long subtitle. If it is absolutely necessary, strategies should be used to decide whether there are pauses or points where sentence coherence allows the translator to divide the text properly. Otherwise, the original information has to be dramatically reduced. On the other hand, if there are very short one-line subtitles it is better to put them together in a two-line subtitle in order to avoid flashing subtitles (Diaz Cintas, Remael, 2006:134-135).

3.5.2 Synchronization and multiple voices

Temporal synchronization affects the viewer's opinion about the quality of the programme, as poor timing can be very annoying. If subtitles come in too early or

too late they are confusing for the viewers and can detract him from enjoying the programme. An accurate timing is crucial because it reinforces the internal cohesion of the translated programme and helps the viewer to identify who is saying what in the programme. However, sometimes it is possible to have a certain degree of asynchrony. This happens when the original dialogue is semantically dense and it is difficult to condense or delete the information. In these cases subtitles could appear a few frames earlier before the beginning of the dialogue and leave the screen a fraction of a second after the speaker finished talking.

As far as multiple voices are concerned, a subtitler has to be careful and avoid confusing the viewer. The latter could hear several voices at the same time and may not know who is saying what. For instance, this could happen when two people are arguing (Cintas, Remael, 2006:136).

3.5.3 Shot changes and delay time between subtitles

A general rules says that a subtitle should not be maintained over the cut. The subtitle should leave the screen just before the cut occurs. This rule is based on studies showing that, if a subtitle does not disappear, the viewer is led to believe that it is a new subtitle and will start re-reading it. However, nowadays it is difficult not to break this rule, especially in action films. One way of avoiding this problem is spotting much more one-line subtitles, sometime lasting less than a second.

A delay time between subtitles has to exist because the viewer has to understand that there was a change in written material. A subtitler needs to leave some frames between the two subtitles otherwise the eye will find it difficult to realize that new information has been presented (Cintas, Remael, 2006:137).

3.5.4 One or two lines?

Studies on the reading speed of the speaker proved that a viewer can read more fastly a long subtitle rather than a short subtitle. This is why he spends less time in reading each of these words. According to Brondel: "Average latency (0,35 sec) in perception seem to make two-line subtitles possibly less demanding of the viewer than e.g two successive one-liners, which require two onsets. Consequently the overall "reading speed" in two liner seems to offer the viewer more reading comfort". So according to this assumption it is always better to have a two-liner when possible. Moreover, a condensed one-liner may be difficult to interpret. Finally, the subtitler has to be good enough to choose the appropriate type of subtitle throughout the film or programme to be translated (Diaz Cintas, Remael, 2006:138).

3.5.5 Reading time and the six seconds rule

The subtitle has to stay on screen enough time to give the opportunity to the viewer to read the content comfortably. However, problems may arise when

people on the screen speak too fast and the viewer is not able to read the translation. It can be very frustrating for viewers to see subtitles disappear when they have not finished reading them. They could have a feeling that they read rather than watched the film.

When deciding the audience's reading time their age and cultural background have to be taken into account. Subtitlers should also keep in mind that not only the written text has to be read but the viewers need to have enough time to scan the images and understand the photography.

The distributional channel could change the speed of the subtitles. According to the six second rule, an average reader can read a two-line subtitle without no difficulties in six seconds. This happens when each line contains a maximum of 37 characters (Diaz Cintas, Remael, 2006:140). Subtitles made for the television screen stay on screen longer than in the cinema or DVD. This is because television is watched by a much wider and various audience. Indeed, the profile of an average cinemagoer is usually perceived as more educated than that of a television viewer.

3.6 The Semiotics of Subtitling

Films are texts of great semiotic complexity in which different sign systems co-operate to create a coherent story. In some way, subtitles have to become a part of this semiotic system. Once they are inserted they have to interact and rely on all

the film's different channels. Audiovisual translation is mediated by two fundamental channels working simultaneously: the visual channel and the acoustic channel.

Initially, cinema represented a universal photographic language that could be understood by all, but after the invention of sound things changed. Nowadays, we can affirm that images are far from universal. Subtitlers must be aware that not only the spoken language has to be translated. Indeed, they have to pay attention of the film's other semiotic systems as well. Therefore, visually rendered information must be taken into account, especially because different cultures have different visual as well as oral and linguistic traditions. The main problem arises when a linguistic sign refers metaphorically to an iconographic sign or image that the source and target culture do not share. The initial optimism about the universality of visual images has its roots in the Eurocentric perspective. As a matter of fact, however, traditions have grown somewhat closer to each other due to the globalization of filmic traditions.

Delabastita distinguished four categories or communication channels:

1. visual presentation-verbal signs (for instance, street names, letters, newspapers and other written documents that appear on the screen.)
2. Visual presentation-non-verbal signs (covers the film's photography)
3. Acoustic presentation-verbal signs (for instance, songs and the dialogue exchanges)
4. Acoustic presentation-non-verbal signs (for instance, instrumental music and background noises)

3.6.1 Subtitling and images

In subtitling, the interaction between words and images must be examined as in some cases the verbal mode further defines information that is also given visually –a process known as anchoring. Conversely, in other cases words and images communicate more or less the same information, and this is called redundancy.

Chaume introduces the term of "semiotic cohesion". An ellipsis or a gap in the subtitled dialogue can be filled by the information the viewer gets from the image. For instance, in a written text a noun may be replaced by a pronoun, and this can also happen in an AVT. The difference, however, lies in the fact that without the support of an image some exchanges would make no sense. That is why there has to be a perfect synchrony between the written target text and narration on screen. In other words, subtitles should never anticipate or be ahead of visual narration on screen. Of course, different types of AVT products require different levels of synchrony (Diaz Cintas, Remael, 2006:146-147).

3.6.2 The multimodality of language

The so-called multimodality of language, which the film makes great use of, is the interaction between speech and gesture. Many experts use video recordings to complement their research into how dialogue works from a linguistic viewpoint, with the study of the interaction between word and movement. Luckman says that the full meaning of a dialogue is first by the linguistic codes and the options of

language, but he also adds that these codes are complemented with body-gestures and facial expressions. In other words, there is a very strong interaction between words and gestures.

Movements, gestures or a simple nod could be quite challenging for the subtitlers. Some stereotypical differences are well-known but much research is still needed in this area, particularly in the field of AVT (Diaz Cintas, Remael, 2006:148).

3.6.3 Opinions about subtitling

Many people have a negative opinion of the quality of subtitles. This is because the translated text is presented to the viewer at the same time as the original. This is also why subtitling differs from other translated texts: the viewers can compare the source and the target text while in other types of translation (dubbing or literary translation) they cannot. Of course, there are bilingual publications with parallel texts, but the reception of the two messages is not as immediate as in the case of subtitling. This is also referred to the "gossiping effect" or "feedback effect": subtitles are constantly accompanied by the film dialogue and therefore the viewers can notice errors or deletions of the linguistic material (Diaz Cintas, Remael, 2006:149).

That is why this coexistence has important repercussions on a translated film or programme. For instance, one common strategy is to transfer all those terms from the original that have strong phonetic and morphological similarities in both languages

Hey, you're paranoid. – Non essere paranoico.

instead of

Non esagerare.

If they do not appear the viewers may believe that the translator has forgotten to translate such-and-such word, which they had clearly heard on the soundtrack.

In addition, it is very important to maintain semantic and syntactic correlation between the dialogue of the film and the content of the subtitles as listening to one text while reading the other may slow down comprehension.

Anyone with the slightest knowledge of the source language can criticize the subtitlers work. Subtitles do not only have to respect space and time limits but also stand up to the scrutiny of an audience that may have some knowledge of the original language. The audience may feel cheated if certain expressions are not being translated as they think they should have. For instance if a rude expression is not relayed in the translation, or if an actor speaks too much and the audience is given only a brief subtitle, the overall effect of the subtitles is affected (Diaz Cintas, Remael, 2006:150).

However, there is a limit to the faithfulness to the source text, not only because of technical limitations but also because the target language cannot be stretched indefinitely. The experts use the expression "half-way translations" for subtitles that render phrases from the source text almost literary. It is interesting to point out that DVD subtitles tend to be closer to the source text language than subtitles for television or the cinema as there is a widespread belief in the industry that the more literary the translation is the more it will be appreciated by the viewers.

Finally, another shortcoming of the subtitling world is lack of explanatory notes to the translation, such as glossaries, footnotes etc. Even translators have understood a play on words well they may not be able to relay it in the subtitle because of the media limitations. However, new developments are under way in this field, such as the inclusion of translator's notes on the screen.

Finally, whether languages or dialects are subtitled or not in the source text and in the translated version will also depend on the viewers' cultural and linguistic background in any given country. For instance, passages in Catalan will have to be translated for the English audience, but it may not be not necessary to translate them for a Spanish public (Diaz Cintas, Remael, 2006: 151-153).

3.6.4 From speech to writing

Subtitling is not only a unique type of translation because it is added to the source text, but also because it renders spoken language in writing. This affect the shape subtitles will have.

There are two basic types of speech in film: scripted and spontaneous speech. Examples of the challenges presented by unscripted speech can be seen in tv programmes such as documentary films. The transition from oral to written also means that some features of written language will not be relayed.

Subtitling style can vary from genre to genre, but some basic subtitling guidelines are almost universal. For instance, grammar and lexis tend to be simplified, while interactional features and intonation are only maintained to some extent. In other

words, not all features of speech are lost, but rendering them all would lead to long and -thus illegible- subtitles.

Especially in documentaries scripted speech can be challenging because much information has to be relayed; on the other hand, unscripted speech can require a lot of interpretation and rewriting due to its hesitations or repetitions. Subtitlers may also have the to decide the form and the content according to the target audience. The person interviewed may speak poor English, leave sentences unfinished, use specialized vocabulary and so on. Therefore, the subtitler has to try hard to explain and interpret the information for the audience (Diaz Cintas, Remael, 2006:155-157).

4. Subtitling the BBC's documentary

"The Quantum Revolution"

This work on subtitling is based on experience I gained last year when I attended a course on Audiovisual translation. The first problem I encountered after I had decided to focus my thesis on subtitling was to find a programme that has not been subtitled yet. Firstly I thought about a movie or a fiction, but almost all of them were already subtitled. A documentary was a good solution because many of them still have not been translated in Italian. I watched some of them and finally decided to translate some parts of the scientific documentary *"The Quantum Revolution"*. I chose to subtitle the parts containing quite a lot information. The purpose of subtitling science was to establish if I could convey all the information to the viewers in spite of space and time constraints imposed by the medium. I did not have a transcript of the text so I had to transcribe the parts that I wanted to subtitle. The next step was the translation from English into Italian. Once the translation was completed I had to choose a subtitling software to create my subtitles. There are many subtitling programmes on the market, such as Subtitle Workshop, Jubler, Aegisub or Clip Flair. After testing a number of them, I decided to use Aegisub because it was the one that I found easier to use. Aegisub is a free, cross-platform open source tool for creating and modifying subtitles.

As I have already pointed out, the combination of different channels, the audio and the visual one, makes audiovisual translation different from literary

translation. Subtitles are independent and isolated units and therefore different from other written texts. That is why I had to adapt my written text translation to the subtitles. Not everything that was present in the written text translation was also present in the subtitles. I had to decide what to condense, reformulate or omit, and I had to do it without altering the source text's meaning. The full English and Italian texts are included in Appendix 1 and 2 to give a better idea of my work in subtitling.

In the following paragraphs, I am going to outline first of all how I changed the punctuation in the subtitles, because even if the rules for the written text and subtitles are almost the same in English and Italian, there are still some differences imposed by the medium which are worth mentioning. Secondly, I shall concentrate on the linguistics of subtitling and provide several examples of the changes I had to make in order to make my subtitles easy to read and comprehend.

4.1 The Punctuation of subtitling and other conventions

Subtitling style has not undergone any process of harmonization or standardization yet, but there are some conventions that have to be followed. Subtitles are a written text so they have to follow the standard rules that govern punctuation. However, there are some differences between subtitling and the other discursive practices which are not as subject to constraints as media are. In some

cases if standard rules are followed, they sometimes cause errors (Diaz Cintas, Remael, 2006: 100).

Subtitles differ from a written text on a page due to their fragmentary nature, that also makes reading more difficult. Each subtitle can be seen as an isolated unit which is disconnected physically from the preceding and the following one. Therefore, reading subtitles that appear and disappear at a given speed is definitely more demanding than reading a written text. Indeed, if we did not understand something that a person on screen says we just cannot go back and read the corresponding subtitle again.

The job of the subtitlers is to make the viewers' life easier, and to do so they revisited some of the standard punctuation rules and gave them some kind of new definitions. As a consequence, there is sometimes a conflict between the standard and rules and what is actually required in subtitling (Diaz Cintas, Remael, 2006: 103). Punctuation marks will now be analysed in groups.

4.1.1 Commas and semicolons

Comma is frequently used and very frequently used wrongly. Commas should not be used whenever pauses are needed. The four uses of commas are: the listing comma, the joining comma, the gapping comma and the bracketing comma (R.L. Trask, 1997:13).

The listing comma is mostly used in a list of three or more words, phrases or complete sentences.

> *The marvels of science, like the internet, laser beams, telecommunication satellites, radio, television, microwaves.*

The joining comma is used to join two complete sentences into a single sentence, and must be followed by a suitable connecting word (such as, and, or, but, while and yet).

> *Superconductors are a miracle of quantum physics, and they're an outstanding example of how we are gradually becoming masters of matter itself.*

The gapping comma is used to show that one or more words have been left out when the missing words would simply repeat the words already used in the same sentence.

> *Some Norwegians wanted to base their national language on the speech of the capital city; others, on the speech of the rural countryside.*

The bracketing commas are the most frequently types of commas. They are used to mark a weak interruption of the sentence. A kind of interruption which does not disturb a smooth flow of the sentence (R.L. Trask, 1997: 14-32).

> *These findings, we would suggest, cast doubts upon his findings*

More or less the same rules mentioned above apply to subtitles, but not always. First of all, joining commas used to join two complete sentences are used in a different way in subtitling (Diaz Cintas, Remael, 2006: 105). Subtitles are seen and read as isolated units. Every subtitle is an independent linguistic unit and usually consists of only one complete sentence.

If in a written text we have a sentence such as the one below, which consists of two complete sentences we punctuate it as follows:

> *Superconductors are a miracle of quantum physics, and they're an outstanding example of how we are gradually becoming masters of matter itself.*

But when I had to subtitle my documentary using this sentence the punctuation changed. Because of time and space limits I had to split up the sentence and make three subtitles out of it:

> *1.Superconductors are*
> *a miracle of quantum physics*
>
> *2 and they're an outstanding example*
> *of how we are gradually becoming*
>
> *3. masters of matter itself.*

As you can see in the example above, commas can be removed. We do not need a comma after physics because the end of the first complete sentence coincides with the end of the subtitle. The use of commas at the end of the subtitle that continues in the next line should be kept to a minimum, since they may be confused with a full stop and lead the viewers to believe that they have reached the conclusion of a sentence. If no punctuation mark appears at the end of a subtitle line, this automatically means that the sentence runs on (Diaz Cintas, Remael, 2006: 105).

The same thing happens with listing commas. In the following sentence we have several listing commas:

> *The marvels of science, like the internet, laser beams, telecommunication, satellites, radio, television, microwaves.*

When subtitling I had to split the sentence and divide it into two subtitles because of time and space constraints:

1.The marvels of science
like the internet, laser beams

2. telecommunication
satellites radio, TV, microwaves.

As you can see the listing commas after laser beams and telecommunication disappeared because they are placed at the end of the subtitle or the line break.

The semicolon is used to join two complete sentences into a single written sentence (R.L. Trask, 1997: 41). The use of a semicolon should be avoided in subtitles as it is easily confused with a colon (Diaz Cintas, Remael, 2006: 105). I used a semicolon in the written text, but I omitted it in the subtitling version. I also had to split the sentence into two subtitles due to space limits. Written text version:

*Quantum theory gives us more than the ability just to manipulate individual atoms**;** it also underlies the architecture of the 20th century.*

Subtitled version:

1.Quantum theory gives us more than the ability
just to manipulate individual atoms

2.it also underlines the architecture of the 20th century.

Another solution would be the use of a full stop instead of a semicolon at the end of the first subtitle.

4.1.2 Full stops and colons

The full stop at the end of a subtitle is unequivocal evidence that a sentence is finished. However, some subtitling companies do not make use of the full stop at the end of a subtitle. This can be confusing for the viewers and it can make subtitles difficult to read (Diaz Cintas, Remael, 2006: 107).

A colon is normally used in subtitling with the same functions it has in standard grammar. It is used to indicate that what follows is an explanation or elaboration of what precedes it:

We found the place easily:
Your directions were perfect.

4.1.3 Exclamation marks and question marks

An exclamation mark is placed at the end of a sentence or a very short phrase which expresses very strong feelings:

1.The theory sounds preposterous,
but it has one tiny thing going for it

2.and that is, it works!

A question mark is placed at the end of a sentence which is a direct question:

Perciò dimmi, da dove arriva il carbonio?

Some companies leave a blank space immediately before an exclamation mark or a question mark.

Too many explanation marks within the same subtitle should be avoided:

** I don't believe it**!!***

Moreover, there are sentences that resemble questions in their structure, but are used as exclamations. They are exclamatory questions and in normal writing we usually put both a question and an exclamation marks (Diaz Cintas, Remael, 2006: 109). This approach should be avoided in subtitling:

** Isn't she clever**?!***

If no answer is needed then we should only use an exclamation mark in subtitles.

Isn't she clever!

Conversely, if the statement receives a reply, then the question mark should be given priority.

Isn't she clever?
- Of course she is.

4.1.4 Dashes and hyphens

Their general function of hyphens is to link compound words:

*1. by creating artificial materials called **meta-materials**.*
*2.It's an **age-old** process, where you take a **carbon-containing** gas*

While in subtitling hyphens are used much in the same way as they are in standard language dashes have a much more specific function than in standard written language and are used to indicate that the text appearing in one subtitle belongs to two different people (Diaz Cintas, Remael, 2006: 111):

1. Ciao, Sono Steven Steiner.
- Steve, come stai? - Benissimo.

4.1.5 Numbers

a) Cardinals

If there is space available, the general rule is that cardinal numbers up to ten are written in letters while the following numbers are given in letters (Diaz Cintas, Remael, 2006: 134):

1.*La superficie del cilindro è di solo **un** atomo.*

2. *But about **20** years ago there was a revolution*

An exception to this rule are the numbers of houses, flats apartments, always written in digits. Moreover, numbers up to ten are also written in digits if they are next to units of weight and measurement (Diaz Cintas, Remael, 2006: 134)

b) Ordinals

There are no strict rules, but because of their length it is common to find them abbreviated (Diaz Cintas, Remael, 2006: 136):

*In the **21st** century science is experimenting with new classes of materials*

4.2 The linguistics of subtitling

4.2.1 Text reduction

The written version of a speech in subtitles is almost always a reduced form of the oral source text. Indeed, subtitling can never be a complete and detailed rendering

and nor should it be. Because of its multiple channels a complete translation is not required. However, this does not mean that viewers do not have the right to high-quality translation (Diaz Cintas, Remael, 2006: 146).

Why text reduction? First of all, because viewers can absorb a speech more quickly than they can read, so subtitles must give them enough time to register and understand what is written at the bottom of the screen. Secondly, viewers must also watch what is happening on the screen, so they must have the time to combine reading with watching. Finally, subtitles are limited to a maximum of two lines. How much text they contain depends on the time available, the subtitling reading speed, and the speed at which the source text is actually pronounced (Diaz Cintas, Remael, 2006:146).

There are two types of text reduction: partial and total reduction. Partial reduction is achieved through condensation and a more concise rendering of the source text. Total reduction is achieved through deletion or omission of lexical items. Usually, both processes are combined and this leads to rewriting that is so typical of subtitling. In other words, a subtitler has to assess how much time and space are available for the written translation and then eliminates what is not relevant, or reformulates what is relevant in a concise form as much as possible (Diaz Cintas, Remael, 2006:147).

In general terms, we could say that the subtitler must act on the principle of relevance. The “mini-max effect” (Cintas, Remael, 2006:148) can explain very well how subtitling works. It is the balance between the effort required by the viewer to process an item, and its relevance for the understanding of the film narrative that determines whether or not it is to be included in the translation. That

is why subtitlers should view the film in its entirety before subtitling. Having seen the entire film gives the subtitler a better idea of what is and is not redundant. The amount of cutting and reformulating varies according to genre, context, speed of delivery etc. For instance, when subtitling off-screen commentators in a documentary film, rendering all they say may be more important, and therefore a reformulation that allows the subtitler to condense without losing information may be a better option than omitting information. However, no general rules can be given as to when to condense, reformulate, or when to omit (Diaz Cintas, Remael, 2006: 148).

A good knowledge of the source and target culture, as well as the information about the target audience could help the subtitler to decide, for example, if the audience is familiar with a certain term.

4.2.2 Condensation and reformulation

How a subtitler should condense depends on what can be done as well as on what really needs to be done. A subtitler must exploit the target language's intrinsic possibilities to the full. This is why a native or at least a near-native command of the target language is very important. Moreover, since some changes are due to linguistic differences between languages reformulation and condensation occur both at word level and at clause/sentence level (Diaz Cintas, Remael, 2006: 150).

4.2.2.1 Condensation and reformulation at word level

a) use of simple rather than compound tenses which are long and complicated and therefore use up valuable space and should therefore be replaced whenever possible.

In this case Prof. David Smith is talking about his research:

> ***We started thinking*** *about interesting things we could do with artificial materials.*

In order to put this information into one two-line subtitle I replaced it with:

> ***We thought*** *about interesting things we could do with artificial materials.*

And my Italian translation was:

> ***Pensavamo*** *a come poter utilizzare questi materiali artificiali.*

Another sentence where I needed to use simple rather than compound tenses was this one:

> *What **we've done is to take** materials that are commonly found.*

The English subtitle was:

> ***We took*** *materials that are commonly found*

My Italian translation was:

> ***Abbiamo preso*** *dei materiali che si trovano comunemente.*

In this way I did not alter the source text meaning, and I also managed to put all the information in only one subtitle.

4.2.2.2 Use of a short near synonym or equivalent expressions

This is also one of the most obvious strategies to reduce subtitle length. What we must keep in mind is that synonyms are almost always near-synonyms rather than exact equivalents. Secondly, they can belong to different registers and can therefore be less appropriate in a particular context (Diaz Cintas, Remael, 2006:

151). Moreover, function words, for instance, are slower to read than content words (*they* opposed to *nanotubes).*

I had to translate the English sentence:

> *Our deepest insight into the atomic world* ***comes*** *from quantum theory.*

My Italian translation for the written text was:

> *La visione più profonda del mondo dell'atomo* ***proviene*** *dalla teoria quantistica.*

However, in order to put the Italian translation into a two-line subtitle I had to find a shorter synonym for the verb *provenire.* In this way I managed to fit the translation into only one subtitle without information loss.

My final translation was:

> *La visione più profonda del mondo dell'atomo* ***deriva*** *dalla teoria quantistica.*

In this English sentence:

> *If we can manipulate those atoms then we can ultimately* ***control what the world looks like.***

I did not like the literal translation of the last part "*control what the world looks like*" and that is why I replaced it with an equivalent expression in Italian:

> *Se potessimo controllare quegli atomi allora* ***potremmo crearci il mondo che vogliamo.***

I also had to find the equivalent expression for the following English sentence:

> ***It really puts you into perspective*** *how small the nanoscale really is.*

My Italian translation was:

> ***Ti dà davvero l'idea*** *di quanto sia piccolo il mondo della nanotecnologia.*

I also had to find an equivalent expression for the last part of the following English sentence:

> *Quantum theory is so strange and bizarre that even Einstein* ***couldn't get his head around it.***

I chose a much formal equivalent expression for my Italian translation:

La teoria quantistica è così strana e bizzarra che nemmeno Einstein ***riuscì a comprenderla.***

Due to space constraints I also had to substitute the sentence below:

We thought about interesting things we could do with artificial materials

With this Italian translation:

Pensavamo a come poter utilizzare questi materiali artificiali.

I thought that this translation could be a good substitute for the much longer version I had in the written text:

Abbiamo iniziato a pensare alle cose meravigliose che potremmo fare con materiali artificiali.

As can be seen subtitling combines two channels, the audio and the visual one. That is why sometimes I used function rather than content words. In this way space is gained and information loss avoided:

We've demonstrated the principle of invisibility at microwave frequencies. ***Microwave frequencies*** *are a few centimeters in size or at least, maybe the size of your thumb.*

Italian version:

Abbiamo dimostrato il principio di invisibilità sulle frequenze di microonde e ***quest'ultime*** *sono grandi solo pochi centimetri, o forse quantomeno la grandezza del pollice.*

Another example is the following:

These extraordinary dimensions give ***nanotubes*** *their unique properties.*

In my Italian translation I preferred to use the pronoun:

Queste dimensioni straordinarie sono la causa delle ***loro*** *esclusive proprietà.*

4.2.2.3 Changing word classes

Very often a change in word class can make for shorter sentences. For example, in the following sentence I turned a verb into a noun:

The theory sounds preposterous, but it has one tiny thing ***going for*** *it and that is, it works!*

My Italian version:

> *Questa teoria può sembrare insensata, ma ha una **particolare caratteristica**: funziona davvero!*

4.2.2.4 Short forms and contractions

Short verb forms were very useful especially in English subtitles and helped me in fitting the translation into only one line. For example, I turned the following English sentence:

> ***We're going to pre-heat** them for the growth process.*

Into the English sentence below:

> ***we'll pre-heat** them for the growth process.*

As you can see from the example above, there are two processes: turning a compound verb into a simple verb and contracting *we will* into *we'll*.

4.2.2.5 Condensation and reformulation at clause/sentence level.

Sometimes I turned negative into affirmative sentence in my Italian translation:

> *In the real world, **you can't** simply disappear and reappear someplace else, that's nonsense!*
>
> *Nel mondo reale **è considerata** un'assurdità il poter sparire e riapparire in un altro posto.*

And also affirmative into negations ones:

> *Our deepest insight into the atomic world comes from the quantum theory. But quantum theory **gives us more than the ability** just to manipulate individual atoms it also underlies the architecture of the 20th century.*
>
> *La visione più profonda del mondo dell'atomo deriva dalla teoria quantistica **che non ci dà soltanto la capacità** di manipolare i singoli atomi ma sta anche alla base dell'architettura del ventesimo secolo.*

4.2.2.6 Joining two sentences into one long sentence

Especially in the case of Prof David Smith I had to do a lot of simplifying and cutting. I also had to distribute long sentences over several subtitles. It was not simple because I had to keep in mind that viewers might find it difficult to read.

I had to subtitle the English sentence below:

> *It's a structure that doesn't exist in nature, something that couldn't be fashioned out of existing materials and something that really functions in an almost science fiction way, that you might imagine wouldn't have been possible just a few years ago.*

While subtitling in English I had to split the sentence into four subtitles as follows:

> *1.It is a structure*
> *that doesn't exist in nature*
>
> *2.something that couldn't be fashioned*
> *of existing materials*
>
> *3.and something that almost functions*
> *like science fiction.*
>
> *4.This wouldn't have been possible*
> *just a few years ago.*

In this case I did not make any significant changes. On the contrary, when I translated it in Italian I decided to put a full stop after *materiali esistenti* and in this way I had two sentences as a result:

> *È un tipo di struttura che non esiste in natura, e non potrebbe essere costruito da materiali già esistenti. È un qualcosa che assomiglia alla fantascienza e che qualche anno fa non si sarebbe potuto immaginare potesse esistere.*

And the final Italian subtitles were:

> *1.È un tipo di struttura*
> *che non esiste in natura*
>
> *2.e non potrebbe essere costruito*
> *da materiali esistenti.*
>
> *3.È un qualcosa*
> *che assomiglia alla fantascienza*
>
> *4.e che qualche anno fa*
> *non si sarebbe potuto realizzare.*

I also decided to replace "*non si sarebbe potuto immaginare potesse esistere"* with "*non si sarebbe potuto realizzare"* because of space constraints.

4.2.2.7 Merge of two or more sentences into one

Joining sentences can help a subtitler to solve space problems. This can be done when two sentences are closely connected or perhaps they are short enough to be joined (Diaz Cintas, Remael, 2006: 161).

For instance, I had two complete sentences in the English version:

> *Our deepest insight into the atomic world comes from the quantum theory. But quantum theory gives us more than the ability just to manipulate individual atoms;it also underlies the architecture of the 20th century.*

I decided to join the two sentences when I translated the text in order to avoid having to repeat the subject, and in this way I also saved some place:

> *La visione più profonda del mondo dell'atomo proviene dalla teoria quantistica che non ci dà soltanto la capacità di manipolare i singoli atomi ma sta anche alla base dell'architettura del ventesimo secolo.*

My final Italian subtitles are:

> *1.La visione più profonda del mondo*
> *dell'atomo deriva dalla teoria quantistica*
>
> *2.che non ci dà soltanto la capacità*
> *di manipolare i singoli atomi*
>
> *3.ma sta anche alla base*
> *dell'architettura del ventesimo secolo.*

4.2.2.8 Use of pronouns to replace nouns or noun phrases

Pronouns are good translation solutions because they are short and they build on visual information that has already been established (Diaz Cintas, Remael, 2006: 160). For instance, in the following example Steven Steiner is pointing at the human hair and a strand on nanotubes as he says:

> *We can zoom in and compare* ***the size of a hair to the size of the nanotubes.***

The translation I provided for the written text was:

> *Possiamo zoomare e paragonare* ***la dimensione del capello alla dimensione dei nanotubi.***

For the final subtitles I decided to use a pronoun:

> *Possiamo zoomare e paragonare **le loro dimensioni.***

4.2.3 Omissions

Omissions or deletions are unavoidable in subtitling. Before deciding to omit, subtitlers must ask themselves: will the audience understand the message or scene without too much of an effort, or will they not misunderstand it? Usually the redundancy rule is the one to follow as word or a phrase may be repeated elsewhere or perhaps an image may fill the gap (Diaz Cintas, Remael, 2006: 162).

4.2.3.1 Omissions at word level

The decision to omit words is usually dictated by issues of relevance and space constraints. Modifiers, mostly adjectives and adverbs, are the most obvious candidates for deletion because they usually do no more than modify the information carried by the verb or noun. Subtitlers need to consider at all times how important modifiers are and decide whether meaning will be affected by the omission of a modifier (Diaz Cintas, Remael, 2006: 163).

Due to space constraints, subtitling often requires adaption as a form of translation. Very often, I had to omit information at word level in order to fit the translation in a single two-line subtitle. For instance, I had to delete two modifiers in the sentence below:

> *This theory offers a **very** different explanation of our world one where the laws of conventional physics **simply** don't apply.*

The Italian translation for the written text was:

> *Questa teoria ci fornisce una spiegazione **completamente diversa** del mondo in cui viviamo: una spiegazione alla quale **non si possono applicare** le leggi della fisica tradizionale.*

My final subtitles are:

> *1.Questa teoria ci fornisce*
> *una spiegazione diversa del mondo*
>
> *2.alla quale non si applicano*
> *le leggi della fisica tradizionale.*

As you can see, in the Italian translation, I omitted the two modifiers. I think that viewers will not feel cheated by this translation because the omissions were not so drastic. The most important information is still there.

While subtitling we are supposed to keep in mind that this kind of text combines two channels, the audio and the visual one, and that is why sometimes we omit information to avoid redundancy. Indeed, it is essential for a subtitler to watch the film or the documentary before translating it, though do know that in real life this is not always the case (Diaz Cintas, Remael, 2006: 107).

In a scene where Michio Kaku is positioning a magnet directly on top of the superconducting ceramic as he says:

> *I'm **now** going to place a magnet directly on top of the superconducting ceramic.*

I think that, in this case, I can omit the adverb *now* because if we look at the image we can see clearly that he is doing it at the moment. In this way I managed to fit the translation into only one subtitle without information loss:

> *Posizionerò il magnete direttamente sopra la ceramica superconduttiva.*

When the interviewer -in my case Michio Kaku- was speaking he had no hesitations or false starts. His speech was prepared and therefore easier to subtitle. On the contrary, his interviewees had a lot of hesitations and false starts. This

could happen because they are not used to being filmed and therefore feel embarrassed. On the one hand, if we are subtitling a film and there is a very shy character we should keep all those hesitations because there are a part of his role. On the other hand, in a documentary, we can omit them without worrying. For instance, when Prof. Steven Steiner is speaking about nanotubes he says:

> *It's actually an age-old process, where you take a carbon-containing gas, and you put your chip on which we want to grow nanotubes, heat up the furnace and the heat causes the gas to decompose,* ***and by that reaction, by that chemical reaction****, we can grow billions of nanotubes.*

As you can see from the example above there is a false start (*and by that reaction, by that chemical reaction*). I decided to omit it in the subtitles because this repetition is definitely not important for the viewer and it would take me a lot of precious space. My final Italian translation was:

> *In effetti, questo è un metodo antichissimo si prende il carbonio contenente gas, si prende il chip sul quale si vogliono sviluppare nanotubi, si riscalda la fornace e a quel punto il calore causa la decomposizione del gas.* ***Da questa reazione chimica****, si possono ottenere miliardi di nanotubi.*

The same thing happened in this case:

> ***This is…These are*** *our furnaces where we grow nanotubes.*
>
> ***Queste sono*** *le fornaci dove noi creiamo nanotubi.*

There were also some hesitations that I decided to omit in the subtitles, such as:

> *No, no we just don't want to get the samples dirty, because the process needs to be pretty clean, as we're growing* ***such… such*** *small things.*
>
> *No, vogliamo solo assicurarci che i campioni non si sporchino perchè il processo deve essere piuttosto pulito dato che stiamo sviluppando cose* ***così*** *piccole.*

There are also omissions at clause/sentence level but they did not occur in my subtitling of the BBC's documentary. Moreover, the part of the documentary that I translated was full of essential information, especially when Prof Michio Kaku was speaking. In a film this does not occur as often. For instance, in a noisy crowded scene that is meant to create an atmosphere rather than anything else,

some talk may not have to be subtitled. If the information that the actor is conveying is not essential a subtitler could simply omit it (Cintas, Remael, 2006: 108).

4.2.4 Segmentation and line breaks

Segmenting means to dividing something into separate parts. As far as subtitling is concerned, segmentation is a division of the text into segments, in our case subtitles, that a viewer can understand without difficulties. Moreover, subtitles are segmented on two levels: a sentence may have to be distributed over two available lines of a subtitle, or line breaks, or it may run on into two or more subtitles. The segmentation rules are the same within and across subtitles but, when dividing text over more than one subtitle, a subtitler should keep in mind that the viewers' memory span is limited at any age (Diaz Cintas, Remael, 2006: 172).

However, when using only one subtitle the text segmentation should follow syntactic and grammatical considerations rather than aesthetic ones. A translator should not wait to fill the first line before venturing into the bottom line. The second line can be shorter than the first one or vice-versa (Diaz Cintas, Remael, 2006: 172).

A text should be subtitled at the highest possible syntactic node. In other words, each subtitle should contain one complete sentence. When a sentence cannot fit into a single-line subtitle, the segmentation on each line should coincide with the highest possible syntactic node. However, it is not always possible to match a

sentence with a subtitle, so it is important to remember that each subtitle should make sense in itself, while somehow indicating that the sentence continues in the next subtitle (Diaz Cintas, Remael, 2006: 173).

4.2.4.1 Line breaks within subtitles: syntactic-semantic considerations

Words should never be hyphenated in subtitling. If a word cannot fit in one line it should just be put it in the following one. If a subtitle consists of two sentences it would be ideal to put one sentence on each line. However, it is not always possible. The sentences in my documentary were quite long, so I had to use one line for each clause. If a subtitle consists of a sentence with two coordinated clauses, and inserting one after the other is impossible because the maximum number of characters per line would be exceeded or would result in an extremely long subtitle, one line for each clause should be used (Diaz Cintas, Remael, 2006:176):

This is a block of nanotubes *and that's a human hair.*	*Questo è un blocco di nanotubi* *e quello è un capello umano.*

It will not always be possible to make such clean-cut divisions. We should always bear in mind that it is not necessary to fill the first line completely before going addressing the problems in the second one. Generally speaking the longest line is established by deciding which word groups are to be kept together. It is not advisable to separate noun or verb groups (Diaz Cintas, Remael, 2006: 177):

*And this **altered** material* *has a unique property.*	*E questo materiale **diverso*** *ha una proprietà unica.*
Superconductors are ***a** miracle of quantum physics*	*I superconduttori sono* ***un** miracolo della fisica quantistica*
*but it's **hard** to imagine* *will stop there.*	*ma è **difficile** immaginare* *che ci fermeremo li.*

If the sentence contains a to-infinitive or a phrasal verb an attempt is made not to split them up (Cintas, Remael, 2006: 177):

Scientists hope ***to raise***	*Gli scienziati sperano* ***di alzare***
the temperature of the Meissner effect.	*la temperatura dell'effetto Meissner.*
that even Einsten	*che nemmeno Einstein*
couldn't get his head around *it.*	*riuscì a comprenderla.*

If the sentence contains a compound verbal form, we not separate auxiliary from lexical verb (Diaz Cintas, Remael, 2006: 177):

It ***was thought to be incompatible***	*Si* ***pensava fosse incompatibile***
with the laws of physics.	*con le leggi della fisica.*

We should also avoid separating a verb from its direct or indirect object (Diaz Cintas, Remael, 2006: 177):

So we'll pre-heat ***them***	*Perciò li preriscalderemo*
for the growth process.	*per il processo di crescita.*

4.2.4.2 Line breaks across subtitles: syntactic-semantic considerations

Sometimes it is not possible to ensure that a sentence and a subtitle coincide. This can happen because the information load is too much, or because the sentence structure does not lend itself to a division into closed off units. In these cases we must run over two or more subtitles.

In my documentary I had many long sentences. For instance I had to spread the following sentence over 3 subtitles (Diaz Cintas, Remael, 2006: 178):

And this altered material	*E questo materiale diverso*
has a unique property	*ha una proprietà unica*
it can bend	*può far ripiegare la radiazione*
electromagnetic radiation around itself	*elettromagnetica su se stessa*

making it invisible to microwaves.	*facendola diventare invisibile alle microonde.*

I had to pay attention while dividing the sentence because some word groups cannot be split. However, sometimes I found other solutions for my Italian translation. For instance, I decided to divide a sentence because in this way I avoided stretching the viewer's memory unduly, as in the following example (Diaz Cintas, Remael, 2006: 178):

It was thought to be incompatible with the laws of physics	*Si pensava fosse incompatibile con le leggi della fisica.*
but last year, scientists made it happen.	*Tuttavia l'anno scorso gli scienziati l'hanno fatto.*

4.2.5 Conclusions on the punctuation and linguistics of subtitling

The punctuation of subtitling has almost the same rules as those of other written texts. However, there are some differences due to time and space constraints imposed by the medium. For instance, the use of joining and listing commas is not always necessary in subtitling because of the subtitles' fragmentary nature. Moreover, we should avoid using semicolons when subtitling. Finally, reading subtitles is more demanding than reading other written texts and that is why the use of punctuation should be kept to a minimum.

Knowledge of the linguistics of subtitling is very important. This kind of translation is considered an adaptation due to the constraints imposed by the medium. The combination of the two channels -the visual and the audio one- renders this kind of text different from other written texts. Indeed, I had to adapt

my translation for the subtitles. That is why I had to condense, reformulate or omit some words or sentences. I had to pay attention because the meaning of the source text had to stay the same. I could not put all the information in the subtitles and that is why I had to decide what was important and what could be sacrificed without altering the meaning of the original.

5.2 Part 1

00.03.08-00.06.55

Our deepest insight into the atomic world

comes from quantum theory.

La visione più profonda del mondo

dell'atomo deriva dalla teoria quantistica

But quantum theory

gives us more than the ability

che non ci dà soltanto

la capacità di manipolare i singoli atomi

just to manipulate individual atoms

it also underlies

the architecture of the 20th century.

ma sta anche alla base

dell'architettura del ventesimo secolo.

The marvels of science

like the internet, laser beams

Le meraviglie della scienza

come internet, raggi laser

telecommunications,

satellites, radio, TV, microwaves

telecomunicazioni

satelliti, radio, tv, microonde

even the structure

of the DNA molecule and biotechnology

anche la struttura del DNA

e la biotecnologia

all of it, ultimately,

comes from quantum theory.

tutto ciò, proviene essenzialmente

dalla teoria quantistica.

This theory offers

a different explanation of our world

one where the laws

of conventional physics don't apply.

Quantum theory

is so strange and bizarre

that even Einsten

couldn't get his head around it.

At the atomic level

we see a phenomenom

that normally

we would consider sheer madness.

In the real world, you can't simply

disappear and reappear

someplace else, that's nonsense!

Questa teoria ci fornisce

una spiegazione diversa del mondo

alla quale non si applicano

le leggi della fisica tradizionale.

La teoria quantistica

è così strana e bizzarra

che nemmeno Einstein

riuscì a comprenderla.

A livello atomico vediamo un fenomeno

che normalmente considereremmo

pura follia.

Nel mondo reale è considerata

un'assurdità il poter sparire

e riapparire in un altro posto

but in quantum world

it happens all the time.

At the level of atoms

and subatomic particles

matter can be

in an infinite number of places at once.

The theory sounds preposterous,

but it has one tiny thing going for it

and that is, it works!

In the coming century it will enable us

to radically transform our world.

These Maglev trains

travel on air due to magnetism

hovering just above the track.

They cruise at up to 580 km\ h

nel mondo quantistico invece

questo succede continuamente.

A livello degli atomi

e delle particelle subatomiche

la materia può essere

in un'infinità di posti all'istante.

Questa teoria può sembrare insensata

ma ha una particolare caratteristica:

funziona davvero!

Nel prossimo secolo ci permetterà

di trasformare il mondo radicalmente.

I treni MagLev viaggiano

sospesi in aria a causa del magnetismo

elevandosi appena sopra il binario.

Viaggiano ad oltre 580 km / h

and they use less energy

than regular trains

ed usano meno energia

rispetto ai treni normali

thanks to a quantum

phenomenon - superconductivity.

grazie al fenomeno

quantistico - la superconduttività.

Superconductors are

a miracle of quantum physics.

I superconduttori sono

un miracolo della fisica quantistica

They're an outstanding example of

how we are gradually becoming

masters of matter itself.

ma anche uno straordinario esempio di

come stiamo gradualmente diventando

dei veri e propri esperti

della materia stessa.

Superconductivity is quite difficult

to achieve in the laboratory

La superconduttività è molto difficile

da realizzare in laboratorio

and it's quite expensive.

ed è molto costosa.

But about 20 years ago

there was a revolution

Ma circa vent'anni fa

ci fu una vera rivoluzione

when it was discovered that

certain ceramics, like yttrium, barium

quando si scoprì che certe

ceramiche come l'ittrio, il bario

copper oxide here,

become superconducting

when exposed to

ordinary liquid nitrogen.

Now, liquid nitrogen

costs as much as ordinary milk.

By cooling the ceramic

to -200 degrees centigrade

I'm effectively creating

a new state of matter.

The new material loses

all its electrical resistance

and becomes superconducting,

able to induce powerful magnetic fields.

I will place a magnet directly on top

of the superconducting ceramic.

The polarity has to be just right.

e l'ossido di rame che vedete

qui diventano superconduttori

se esposti al semplice azoto liquido.

Ora, l'azoto liquido

costa quanto una bottiglia di latte.

Raffreddando la ceramica

a – 200 gradi centigradi

io sto di fatto creando

un nuovo stato della materia.

Il nuovo materiale perde

tutta la sua resistenza elettrica

e diventa superconduttivo

capace di produrre potenti campi magnetici.

Posizionerò il magnete direttamente

sopra la ceramica superconduttiva.

La polarità deve essere giusta.

There. It's floating now.

Ecco. Ora sta levitando.

This is the Meissner effect.

Questo si chiama effetto Meissner.

The presence of the magnet on top

La presenza del magnete sovrastante

Induces a secondary magnetic field
within the superconductor

produce un secondo campo magnetico
all'interno del superconduttore

and the two magnetic fields
repel each other

e i due campi magnetici si respingono

giving you the illusion of anti-gravity.

dandoci l'illusione
della presenza di anti-gravità.

Notice that this thing is spinning
without any friction whatsoever.

Come vedete, questo oggetto
sta ruotando senza nessun tipo di attrito.

Scientists hope to raise
the temperature of the Meissner effect

Gli scienziati sperano di alzare
la temperatura dell'effetto Meissner

to avoid having to cool the ceramic.

per evitare di dover
raffreddare la ceramica.

5.3 Part 2

00.08.03-00.11.14

Until recently there was

a property of matter so fantastic

it was thought to exist

only in myths and legends.

It was thought to be incompatible

with the laws of physics

but last year,

scientists made it happen.

They created a material

which shouldn't exist in nature.

When light hits an object

it's the object's atomic structure

that determines what we see

whether it's translucent marble

clear water or green leaves.

Fino a poco tempo fa, c'era una

proprietà della materia così particolare

che si credeva potesse esistere

solo nei miti e nelle leggende.

Si pensava fosse incompatibile

con le leggi della fisica.

Tuttavia l'anno scorso

gli scienziati l'hanno fatto.

Crearono un materiale

che non dovrebbe esistere in natura.

Quando la luce colpisce un oggetto

è la struttura atomica dell'oggetto stesso

che determina quello che vediamo

che sia marmo traslucido

acqua limpida o foglie verdi.

It all depends on how the light

interacts with the atoms.

If we can manipulate those atoms

then we can ultimately control

what the world looks like.

This is exactly what David Smith

and his team

in North Carolina are beginning to do

by creating artificial

materials called meta-materials.

We thought about interesting things

we could do with artificial materials

and one of the things that came up was

Tutto dipende da come

la luce interagisce con gli atomi.

Se potessimo controllare quegli atomi

allora potremmo crearci

il mondo che vogliamo.

Questo è esattamente quello

che stanno iniziando a fare

David Smith e il suo team

nella Carolina del Nord

creando materiali artificiali

chiamati meta-materiali

Pensavamo a come poter utilizzare

questi materiali artificiali.

Per esempio,

ci siamo inventati un qualcosa

we could make

something like an invisibility cloak.

che si potrebbe chiamare

il mantello invisibile.

We took materials that are

commonly found, like copper and plastic

Abbiamo preso dei materiali

che si trovano comunemente

which is what our circuit board materials

are made out of

e di cui sono fatti i nostri circuiti

stampati, come il rame e la plastica.

and we've placed patterns in the copper

so that they're tiny circuits.

Abbiamo messo delle forme nel rame, ottenendo

dei minuscoli circuiti.

And these circuits act as artificial atoms

in a regular material

Questi circuiti si comportano come

atomi artificiali in materiali normali

except now we've made

an artificial material.

solo che così adesso abbiamo creato

un materiale artificiale.

And this altered material

has a unique property

E questo materiale diverso

ha una proprietà unica

it can bend

electromagnetic radiation around itself

può far ripiegare la radiazione elettromagnetica

su se stessa

making it invisible to microwaves.

facendola diventare

invisibile alle microonde.

The lime green waves are microwaves.

Le onde verdi che vedete

sono microonde.

When an ordinary copper ring

is placed in their path

Quando un semplice anello di rame

è situato sul loro percorso

the waves are disturbed.

le onde vengono disturbate.

But when the meta-material

is placed there, the waves bend around it

Quando il meta-materiale viene messo lì,

le onde si ripiegano su di esso

and seamlessly merge on the other side,

as if there was nothing there.

e si fondono completamente

sull'altro lato

come se non ci fosse

nulla ad ostacolarle.

An invisibility cloak

is something entirely new.

Un mantello invisibile

è un qualcosa di completamente nuovo.

It is a structure

that doesn't exist in nature

E' un tipo di struttura

che non esiste in natura

something that couldn't be fashioned

of existing materials

e non potrebbe essere costruito

da materiali esistenti.

something that almost functions

like science fiction.

E' un qualcosa

che assomiglia alla fantascienza

This wouldn't have been possible

just a few years ago.

e che qualche anno fa

non si sarebbe potuto realizzare.

We've demonstrated the principle of invisibility

at microwave frequencies

Abbiamo dimostrato il principio di invisibilità

sulle frequenze di microonde.

Microwave frequencies

are a few centimeters in size

e quest'ultime sono solo

di pochi centimetri

or at least,

maybe the size of your thumb.

o forse grandi quanto un pollice.

Now we're looking into the future

Ora perciò stiamo guardando

verso il futuro

and whether or not

we can do this invisible light.

per vedere se siamo capaci

di creare luce invisibile.

In addition to microwaves

scientists have already succeeded

in bending red and blue light.

Full invisibility

may be just decades away.

The first applications

are likely to be for military stealth

but it's hard to imagine

will stop there.

Oltre alle frequenze di microonde

gli scienziati sono riusciti

a far piegare anche le luci rosse e blu.

L'invisibilità completa potrebbe essere lontana

solo qualche decennio.

Dapprima saranno probabilmente

utilizzate per la segretezza militare

ma è difficile immaginare

che ci fermeremo li.

5.4 Part 3

00.22.50-00.25.58

In the 21st century science is experimenting	*Nel 21. sec. la scienza sta sperimentando*
with new classes of materials	*con nuove classi di materiali.*
like carbon resins	*come la resina di carbonio,*
ceramics and polymers.	*la ceramica e il polimero.*
And one of the most promising	*una delle più promettenti è una sostanza*
is a substance that's actually	*più forte e leggera dell'acciaio.*
stronger and lighter than steel	
and in fact, you could replace	*In effetti, si può sostituire*
the steel in these cables	*l'acciaio in questi cavi*
with fibres as thin as a human hair.	*con delle fibre sottili*
	come il capello umano.
That's the promise of carbon nanotubes.	*Ed è questa la promessa*
	dei nanotubi di carbonio.
Carbon nanotubes	*I nanotubi di carbonio*
are a miracle of nature.	*sono un vero miracolo della natura.*

They're made out of individual carbon

atoms arranged in a hollow cylinder.

contengono singoli atomi di carbonio

sistemati in una cavità cilindrica.

The cylinder surface

is just one atom across.

La superficie del cilindro

è di solo un atomo.

The diameter is only 50 atoms across.

Il diametro è di soli 50 atomi.

And these tubes can be

billions of atoms long.

e questi tubi possono essere lunghi

bilioni di atomi.

These extraordinary dimensions

give nanotubes their unique properties.

Queste dimensioni straordinarie sono

la causa delle loro esclusive proprietà.

Their atoms are bonded

with the strength of diamonds

si legano con la stessa proprietà

responsabile della durezza del diamante

yet they have the flexibility of fibre.

tuttavia, hanno la flessibilità della fibra.

Hi, I'm Stephen Steiner.

-Steve, how do you do? - Great.

Ciao, Sono Steven Steiner.

-Steve, come stai? - Benissimo.

Here at MIT, S. Steiner and J. Hart

will show me how to grow my own.

Quì alla MIT S.Steiner e J. Hart

mi insegneranno come sviluppare i miei.

So this is where it all happens, right?

Perciò è qui dove succede il miracolo?

Yes, these are our furnaces

where we grow nanotubes.

Sì, queste sono le fornaci

dove noi sviluppiamo nanotubi.

So tell me,

where does the carbon come from?

Perciò dimmi,

da dove arriva il carbonio?

It comes from a gas,

which is right in this tank here.

Arriva dal gas

che è proprio in questo serbatoio.

It's an age-old process,

where you take a carbon-containing gas

E' un metodo antichissimo dove si prende

il carbonio contenente gas

and you put your chip

on which we want to grow nanotubes

si mette il chip sul quale

si vogliono sviluppare nanotubi

we heat up the furnace and

the heat causes the gas to decompose

si riscalda la fornace e a quel punto

il calore causa la decomposizione del gas

and by that chemical reaction,

we can grow billions of nanotubes.

Da questa reazione chimica

si possono ottenere miliardi di nanotubi.

It's not dangerous, is it?

Non è pericoloso, vero?

No, no we just don't want
to make the samples dirty

No, vogliamo solo assicurarci
che i campioni non si sporchino

because the process needs to be clean,
as we're growing such small things.

e il processo sia pulito
dato che sviluppiamo cose così piccole.

Our substrate has catalyst seeds,
nano particles of a metal

Il nostro substrato ha particelle di
catalizzatori, nanoparticelle metalliche

and these act as the seeds
from which the nanotubes will grow.

e queste agiscono come semi
dai quali si svilupperanno i nanotubi.

so we'll pre-heat them
for the growth process.

Perciò li preriscalderemo
per il processo di crescita.

It's hard to believe
that under this tiny piece of glass

E' difficile immaginare che sotto
questo piccolissimo pezzo di vetro

we're creating one of the strongest
materials known to man.

stiamo creando uno dei materiali
più forti conosciuti dall'uomo.

Yet carbon nanotubes are so small

Tuttavia i nanotubi di carbonio
sono così piccoli

we can only see them

under a powerful microscope.

che possiamo vederli soltanto con l'aiuto

di un potentissimo microscopio.

This is a block of nanotubes

and that's a human hair.

Questo è un blocco di nanotubi

e quello è un capello umano.

So now we can focus in.

Ora possiamo mettere a fuoco.

There we have a strand of carbon nanotubes

sitting on the human hair.

e lì vediamo un filo di nanotubi di

carbonio seduto su un capello umano.

We can zoom in and compare them.

Possiamo zoomare e paragonare

le loro dimensioni.

Because even this strand contains

hundreds, thousands of nanotubes.

Anche questo filo contiene

centinaia, migliaia di nanotubi.

It really puts you into perspective

how small the nanoscale really is.

Ti dà davvero l'idea di quanto sia piccolo

il mondo della nanotecnologia.

So far we can only grow

short lengths of carbon nanotubes.

Fino ad ora siamo riusciti a sviluppare

solo piccole lunghezze di nanotubi

But hundreds of businesses and

researchers are racing to develop

ma centinaia di uomini d'affari e

ricercatori stanno combattendo

longer carbon nanotubes

in order to harness their huge potential.

nel tentativo di sfruttare

il loro enorme potenziale.

5. “The Quantum Revolution” subtitles

5.1 Introduction

“The Quantum Revolution” is the third episode in Michio Kaku’s documentary *“Visions of the Future”*. It is a scientific documentary produced by BBC4. It was first broadcast in 2007, and it was hosted by the Japanese-American theoretical physicist, Michio Kaku.

The programme is a three-hour documentary on future technology and is divided into three parts. The third part *“The Quantum Revolution”* is entirely devoted to the quantum world. It shows how various science fiction ideas are now becoming reality thanks to the latest scientific advances such as meta-materials, superconductors and carbon nanotubes. The fundamental theme and focus of *“The Quantum Revolution”* is that human kind is at a turning point in history.

The various concepts of physics are firstly introduced and then analysed in detail through the use of specific terminology. It is a captivating programme, which makes use of futuristic images and metaphorical language in order to express complex theories related to time, space and matter. However, while the style chosen, is simple and clear, it serves the purpose of simplifying the notions, while the documentary still shows a terminological precision that makes it a valuable, scientifically accurate programme. The documentary is targeted at well-informed viewers, ranging from those possessing merely a basic knowledge of the subject

matter to people with background knowledge of physics and a general interest in science, but not experts.

I subtitled three parts of *"The Quantum Revolution"* documentary. The first part is about superconductivity. The second part is about meta-materials. Finally, the third part is about carbon nanotubes.

Conclusion

The aim of this dissertation was to explore the subtitling world by providing subtitles to the BBC's scientific documentary *The Quantum Revolution*. Luckily, I found a great quantity of material about audiovisual translation and especially subtitling to back up my analysis an research.

First I provided an overview of science communication because the documentary I planned to analyse was a good example of how scientist and/or science communicators try to heighten general awareness of science in the public domain. Thanks to science communication people learn about important developments that affect human life. In the second chapter I explored the world of audiovisual translation, while in the third chapter I concentrated on subtitling. The last two chapters, the fourth and the fifth, are entirely devoted to the analyses of my work and they provide subtitles of some parts of the BBC's scientific documentary *The Quantum Revolution*.

Subtitling has always been considered an adaptation more than a translation in the traditional sense of the word. Before subtitling I translated the transcript. In the process I noticed that many features of my translation for the written text had to be simplified, reformulated or omitted in order to produce subtitles that the viewers can read at a glance. However subtitles should be not considered less important than transcript translation. As with all translations with severe constraints, subtitling requires great care and skill. Therefore, more and more

experts in the field of Translation studies (TS) are increasingly interested in this area.

Subtitling is also a good way of learning foreign languages. This is because while we hear perhaps the actors, reporters, interviewers and so on speaking in one foreign language in the subtitles we can find a translation of what they are saying. Indeed, people living in countries where subtitling is more common than dubbing claim that they learn more by watching the television or listening to the radio than at school.

While transcribing the documentary, translating the transcript from English into Italian and finally creating my subtitles I realized how complex the work of an audiovisual translator is. The decisions to make are many and very important because they influence the final product and finally reception and communication. I had to fit my translation in a two-line subtitle without omitting important information. Sometimes I had to sacrifice some parts of the text that I thought were not important for the comprehension: for example the modifiers. Moreover, omitting information was not the only method I used. In order to give all the information needed to convey the message to the viewers I often had to reformulate or condense my translation. In this way, I managed to create subtitles that the viewers could understand and read at a glance. It was not very simple because the text was full of specific terms that could not be sacrificed. Indeed, I chose a scientific documentary because I knew it would have been a challenge. I believe that there should be more general awareness about the importance of this kind of translation. Universities can contribute by doing more research in this field of Translation Studies.

APPENDIX 1

BBC FOUR

Michio Kaku on Quantum Mechanics

00.03.08-00.06.55

Michio Kaku: Our deepest insight into the atomic world comes from quantum theory. But quantum theory gives us more than the ability just to manipulate individual atoms; it also underlies the architecture of the 20th century. The marvels of science, like the internet, laser beams, telecommunication satellites, radio, television, microwaves. Even the structure of the DNA molecule and biotechnology. All of it, ultimately, comes from quantum theory. This theory offers a very different explanation of our world. One where the laws of conventional physics simply don't apply. Quantum theory is so strange and bizarre, that even Einstein couldn't get his head around it. At the atomic level, we see a phenomenon that normally we would consider sheer madness. In the real world, you can't simply disappear and reappear someplace else. That's nonsense. But in quantum world, it happens all the time. At the level of atoms and subatomic particles, matter can be in an infinite number of places at once. The theory sounds preposterous, but it has one tiny thing going for it, and that is, it works. And in the coming century, it will enable us to radically transform our world. These Maglev trains travel on air due to magnetism, hovering just above the track. They cruise at up to 580 kilometres an hour, and they use less energy than regular trains, thanks to a quantum phenomenon - superconductivity. Superconductors are a miracle of quantum physics, and they're an outstanding

example of how we are gradually becoming masters of matter itself. Now, usually, superconductivity is quite difficult to achieve in the laboratory, and it's quite expensive. But about 20 years ago, there was a revolution, when it was discovered that certain ceramics, like yttrium, barium, copper oxide here, become superconducting when exposed to ordinary liquid nitrogen. Now, liquid nitrogen costs as much as ordinary milk. By cooling the ceramic to -200 degrees centigrade, I'm effectively creating a new state of matter. The new material loses all its electrical resistance and becomes superconducting, able to induce powerful magnetic fields. I'm now going to place a magnet directly on top of the superconducting ceramic. The polarity has to be just right. There. It's floating now. This is the Meissner effect. The presence of the magnet on top induces a secondary magnetic field within the superconductor, and the two magnetic fields repel each other, giving you the illusion of anti-gravity. Notice that this thing is spinning without any friction whatsoever. Scientists hope to raise the temperature of the Meissner effect to avoid having to cool the ceramic.

00.08.03-00.11.14

Michio Kaku: Until recently there was a property of matter so fantastic, it was thought to exist only in myths and legends. It was thought to be incompatible with the laws of physics. But last year, scientists made it happen. They created a material which shouldn't exist in nature. When light hits an object, it's the object's atomic structure that determines what we see, whether it's translucent marble, clear water or green leaves. It all depends on how light interacts with the atoms. If we can manipulate those atoms, then we can ultimately control what the world looks like. This is exactly what David Smith and his team in North Carolina are beginning to do, by creating artificial materials called meta-materials.

Prof. David Smith: We started thinking about interesting things we could do with artificial materials, and one of the things that came up was, we could make something like an invisibility cloak. What we've done is to take materials that are commonly found, something like copper and plastic, which is what our circuit

board materials are made out of, and we've placed patterns in the copper so that they're tiny circuits. And these circuits act as artificial atoms in a regular material, except now we've made an artificial material.

Michio Kaku: And this altered material has a unique property: it can bend electromagnetic radiation around itself, making it invisible to microwaves. The lime green waves are microwaves. When an ordinary copper ring is placed in their path, the waves are disturbed. But when the meta-material is placed there, the waves bend around it and seamlessly merge on the other side, as if there was nothing there.

Prof. David Smith: An invisibility cloak is something entirely new. It's a structure that doesn't exist in nature, something that couldn't be fashioned out of existing materials and something that really functions in an almost science fiction way, that you might imagine wouldn't have been possible just a few years ago. We've demonstrated the principle of invisibility at microwave frequencies. Microwave frequencies are a few centimeters in size, or at least, maybe the size of your thumb. So now we're looking into the future, and whether or not we can do this invisible light.

Michio Kaku: In addition to microwaves, scientists have already succeeded in bending red and blue light. Full invisibility may be just decades away. The first applications are likely to be for military stealth. But it's hard to imagine we'll stop there.

00.13.05-00.16.14

Michio Kaku: In the 21st century science is experimenting with new classes of materials like carbon resins, ceramics and polymers. And one of the most promising is a substance that's actually stronger and lighter than steel, and in fact, you could replace the steel in these cables with fibres as thin as a human hair. That's the promise of carbon nanotubes. Carbon nanotubes are a miracle of nature. They're made out of individual carbon atoms arranged in a hollow cylinder. The

cylinder surface is just one atom across. The diameter is only 50 atoms across. And these tubes can be billions of atoms long. These extraordinary dimensions give carbon nanotubes their unique properties. Their atoms are bonded with the strength of diamonds, yet they have the flexibility of fibre. Hi. I'm Stephen Steiner. Steve, how do you do? Great. Here at MIT, Stephen Steiner and John Hart are going to show me how to grow my own. So this is where it all happens?

Steven Steiner: Yes. This is…These are our furnaces where we grow nanotubes.

Michio Kaku: So tell me, where does the carbon come from?

Steven Steiner: It comes from a gas, which is in this tank. It's actually an age-old process, where you take a carbon-containing gas, and you put your chip on which we want to grow nanotubes, heat up the furnace and the heat causes the gas to decompose, and by that reaction, by that chemical reaction, we can grow billions of nanotubes.

Michio Kaku: It's not dangerous, is it?

Steven Steiner: No, no we just don't want to get the samples dirty, because the process needs to be pretty clean, as we're growing such… such small things.

John Hard: Our substrate has catalyst seeds, nano particles of a metal, and these act as the seeds from which the nanotubes grow. We're going to pre-heat them for the growth process.

Michio Kaku: It's hard to believe that under this tiny piece of glass we're creating one of the strongest materials known to man. Yet carbon nanotubes are so small, we can only see them under a powerful microscope.

Steven Steiner: This is a block of nanotubes, and that's a human hair. So now we can focus in... and there we have a strand of carbon nanotubes sitting on the human hair. We can zoom in and compare the size of the hair to the size of the nanotubes. Even this strand contains hundreds, thousands of nanotubes altogether.

John Hard: It really puts into into perspective how small the nanoscale really is.

Michio Kaku: So far we can only grow short lengths of carbon nanotubes. But hundreds of businesses and researchers are racing to develop longer carbon nanotubes in order to harness their huge potential.

APPENDIX 2

BBC FOUR

MICHIO KAKU SULLA MECCANICA QUANTISTICA

00.03.08-00.06.55

Michio Kaku: La visione più profonda del mondo dell'atomo proviene dalla teoria quantistica che non ci dà soltanto la capacità di manipolare i singoli atomi ma sta anche alla base dell'architettura del ventesimo secolo. Le meraviglie della scienza come internet, raggi laser, telecomunicazioni, satelliti, radio, televisione, microonde; anche la struttura del DNA e la biotecnologia provengono essenzialmente dalla teoria quantistica. Questa teoria ci fornisce una spiegazione completamente diversa del mondo in cui viviamo: una spiegazione alla quale non si possono applicare le leggi della fisica tradizionale. La teoria quantistica è così strana e bizzarra che nemmeno Einstein riuscì a comprenderla. A livello atomico vediamo un fenomeno che normalmente considereremmo pura follia: nel mondo reale è considerata un'assurdità il poter semplicemente sparire e riapparire in un altro posto; nel mondo quantistico invece, questo succede continuamente. A livello degli atomi e delle particelle subatomiche la materia può essere in un'infinità di posti all'istante. Questa teoria può suonare insensata ma ha una particolare caratteristica: funziona davvero! Nel prossimo secolo ci darà la possibilità di trasformare il nostro mondo radicalmente. I treni MagLev che vedete quì viaggiano sospesi in aria a causa del magnetismo, elevandosi appena sopra il binario. Viaggiano ad oltre 580 km / h ed usano meno energia rispetto ai treni

normali grazie al fenomeno quantistico- la superconduttività. I superconduttori sono un miracolo della fisica quantistica, ma anche uno straordinario esempio di come stiamo gradualmente diventando dei veri e propri esperti della materia stessa. Di solito la superconduttività è molto difficile da realizzare in laboratorio ed è molto costosa. Ma circa vent'anni fa ci fu una vera rivoluzione quando si scoprì che certe ceramiche come l'ittrio, il bario e ossido di rame che vedete quì diventano superconduttori se esposti al semplice azoto liquido. Ora, l'azoto liquido costa quanto una bottiglia di latte. Raffreddando la ceramica a – 200 gradi centigradi io sto di fatto creando un nuovo stato della materia. Il nuovo materiale perde tutta la sua resistenza elettrica e diventa superconduttivo, capace di produrre potenti campi magnetici. Adesso posizionerò il magnete direttamente sopra la ceramica superconduttiva. La polarità deve essere giusta. Ecco. Ora sta levitando. Questo si chiama effetto Meissner: la presenza del magnete sovrastante produce un secondo campo magnetico all'interno del superconduttore e i due campi magnetici si respingono dandoci l'illusione della presenza di anti-gravità. Come vedete, questo oggetto sta ruotando senza nessun tipo di attrito. Gli scienziati sperano di alzare la temperatura dell'effetto Meissner per evitare di dover raffreddare la ceramica.

00.22.50-00.25.58

Michio Kaku: Fino a poco tempo fa, c'era una proprietà della materia così particolare che si credeva potesse esistere solo nei miti e nelle leggende. Si pensava fosse incompatibile con le leggi della fisica. Tuttavia, l'anno scorso gli scienziati riuscirono a creare un materiale che non dovrebbe esistere in natura. Quando la luce colpisce un oggetto, è la struttura atomica dell'oggetto stesso che determina quello che noi vediamo: che sia marmo traslucido, acqua limpida o foglie verdi. Tutto dipende da come la luce interagisce con gli atomi. Se potessimo controllare quegli atomi allora noi sostanzialmente potremmo crearci il mondo che vogliamo. Questo è esattamente quello che stanno iniziando a fare David Smith e il suo team nella Carolina del Nord, creando materiali artificiali chiamati metamateriali.

Prof. David Smith: Abbiamo iniziato a pensare alle cose meravigliose che potremmo fare con materiali artificiali. Per esempio ci siamo inventati un qualcosa che si potrebbe chiamare il mantello invisibile. Quello che abbiamo fatto è stato prendere dei materiali che si trovano comunemente e di cui sono fatti i nostri circuiti stampati, come il rame e la plastica, abbiamo messo delle forme nel rame ottenendo così dei minuscoli circuiti. Questi circuiti si comportano come atomi artificiali in materiali normali solo che così adesso abbiamo creato un materiale artificiale.

Michio Kaku: E questo materiale diverso ha una proprietà unica: può far ripiegare la radiazione elettromagnetica su se stessa facendola diventare invisibile alle microonde. Le onde verdi che vedete sono microonde. Quando un semplice anello di rame è situato sul loro percorso le onde vengono disturbate. Ma quando il metamateriale viene messo lì, le onde si ripiegano su di esso e si fondono completamente sull'altro lato come se non ci fosse nulla ad ostacolarle.

Prof. David Smith: Un mantello invisibile è un qualcosa di completamente nuovo. E' un tipo di struttura che non esiste in natura, e non potrebbe essere costruito da materiali già esistenti. E' un qualcosa che assomiglia alla fantascienza e che qualche anno fa non si sarebbe potuto immaginare potesse esistere. Abbiamo dimostrato il principio di invisibilità sulle frequenze di microonde e quest'ultime sono grandi solo pochi centimetri o forse quantomeno la grandezza del pollice. Ora perciò stiamo guardando verso il futuro per vedere se siamo capaci di creare luce invisibile.

Michio Kaku: Oltre alle frequenze di microonde gli scienziati sono riusciti a far piegare anche le luci rosse e blu. L'invisibilità completa potrebbe essere lontana solo qualche decennio. Le prime applicazioni saranno probabilmente utilizzate per la segretezza militare ma è difficile immaginare che ci fermeremo li.

00.22.50-00.25.58

Michio Kaku: Nel ventunesimo secolo la scienza sta sperimentando nuove tipologie di materiali come la resina di carbonio, la ceramica e il polimero. A dire il vero, una delle più promettenti è una sostanza più forte e più leggera dell'acciaio. In effetti, si può sostituire l'acciaio in questi cavi con delle fibre sottili come il capello umano. Ed è questa la promessa dei nanotubi di carbonio. Sono un vero miracolo della natura: sono composti da singoli atomi di carbonio sistemati in una cavità cilindrica. La superficie del cilindro è di solo un atomo, il diametro del cilindro è di solo 50 atomi e questi tubi possono essere lunghi bilioni di atomi. Queste dimensioni straordinarie sono la causa delle esclusive proprietà di questi nanotubi di carbonio: hanno una grande stabilità, perché sono legati con la stessa proprietà responsabile della durezza del diamante, tuttavia, hanno la flessibilità della fibra. (Ciao, sono Steven Steiner. Steve come stai?) Qui alla MIT Steven Steiner e John Hart mi insegneranno come far crescere i miei nanotubi. Perciò è qui dove succede il miracolo?

Steven Steiner: Sì. Questo è.. queste sono le fornaci dove noi sviluppiamo nanotubi.

Michio Kaku: Perciò dimmi, da dove arriva il carbonio?

Steven Steiner: Arriva dal gas che è in questo serbatoio. In effetti, questo è un metodo antichissimo dove tu prendi il carbonio contenente gas, metti il tuo chip sul quale vuoi sviluppare nanotubi, si riscalda la fornace e a quel punto il calore causa la decomposizione del gas e da questa reazione, da questa reazione chimica, possiamo sviluppare bilioni di nanotubi.

Michio Kaku: Non è pericoloso, vero?

Steven Steiner: No, no, vogliamo solo assicurarci che i campioni non si sporchino perchè il processo deve essere piuttosto pulito dato che stiamo facendo svipuppando cose così… così piccole.

John Hart: Il nostro substrato ha particelle di catalizzatori, nanoparticelle metalliche, e queste agiscono come semi dai quali si svilupperanno i nanotubi. Perciò inizieremo a preriscaldarli per il processo di crescita.

Michio Kaku: E' difficile immaginare che sotto questo piccolissimo pezzo di vetro stiamo creando uno dei materiali più forti conosciuti dall'uomo. Tuttavia i nanotubi di carbonio sono così piccoli che possiamo vederli soltanto con l'aiuto di un potentissimo microscopio.

Steven Steiner: Questo è un blocco di nanotubi e quello è un capello umano. Ora possiamo mettere a fuoco e lì vediamo un filo di nanotubi di carbonio seduto su un capello umano. Possiamo zoomare e paragonare la dimensione del capello alla dimensione dei nanotubi. Anche questo filo contiene centinaia, migliaia di nanotubi tutti insieme.

John Hart: Ti dà davvero l'idea di quanto sia piccolo il mondo della nanotecnologia.

Michio Kaku: Fino ad ora siamo riusciti a far crescere solo piccole lunghezze di nanotubi di carbonio ma centinaia di uomini d'affari e ricercatori stanno combattendo per sviluppare nanotubi di carbonio sempre più lunghi nel tentativo di sfruttare il loro enorme potenziale.

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