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UNIVERSITÀ DEGLI STUDI DI PADOVA

Corso di studi in Scienza dei Materiali
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Dipartimento di Scienze Chimiche

EFFETTI TERMICI DELL'INTERAZIONE TRA RADIAZIONE ELETTROMAGNETICA E I MATERIALI

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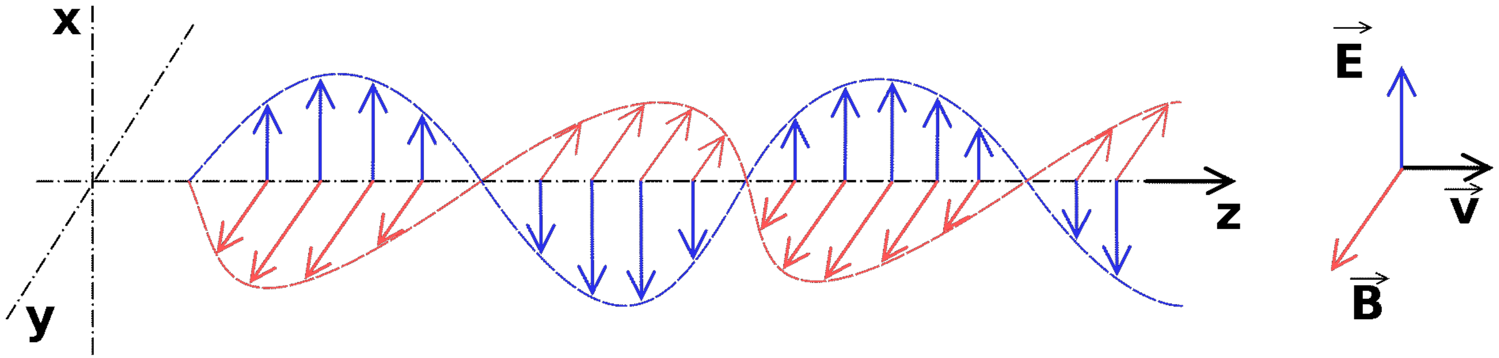
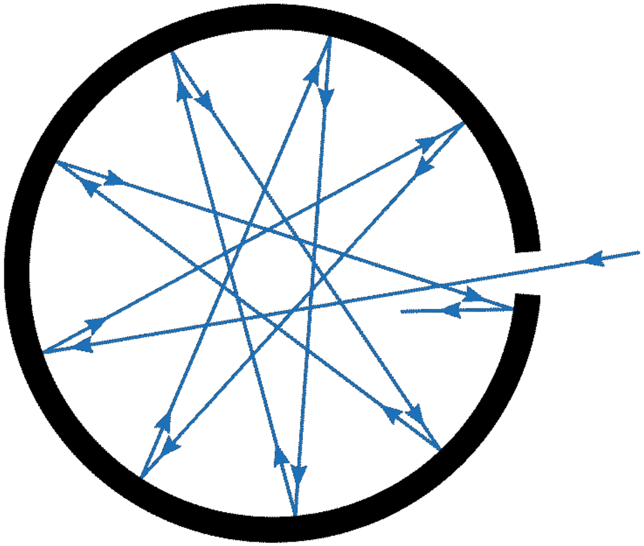
ABSTRACT



IL CORPO NERO E LA RADIAZIONE TERMICA



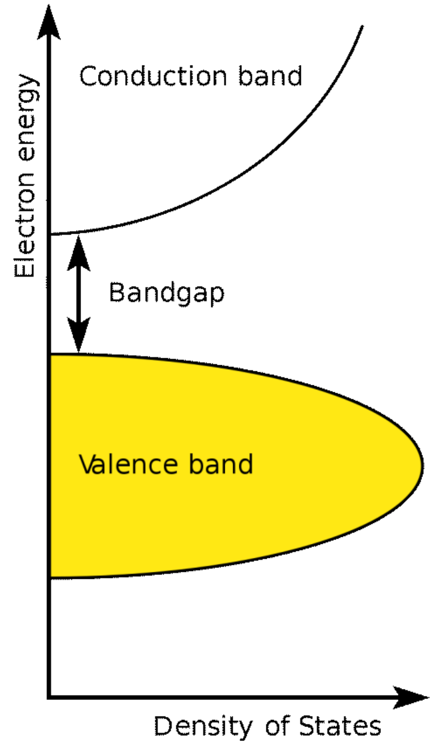
IL CORPO NERO E LA RADIAZIONE TERMICA

$$\lambda_{max} \cdot T = 2.8978 \cdot 10^{-3} m \cdot K$$

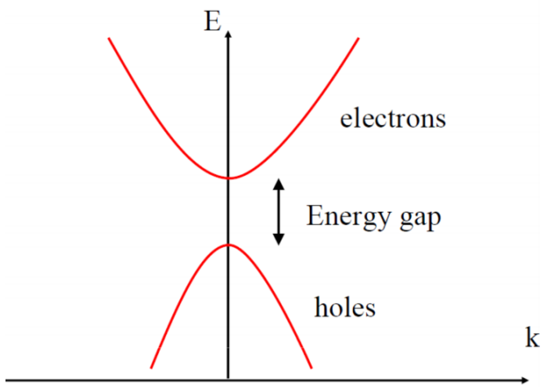
$$e_{tot} = \sigma T^4$$

$$\sigma = 5.67 \cdot 10^{-8} \frac{W}{m^2 \cdot K^4}$$

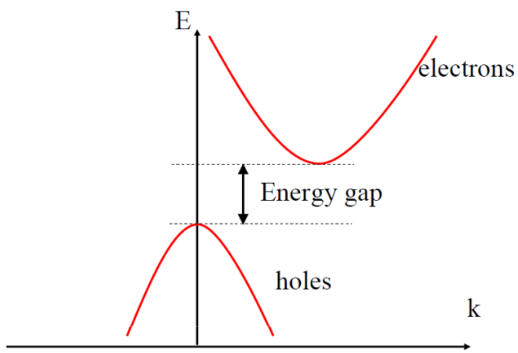
SEMICONDUTTORI E RICOMBINAZIONE AUGER[1]



SEMICONDUTTORI E RICOMBINAZIONE AUGER[1]

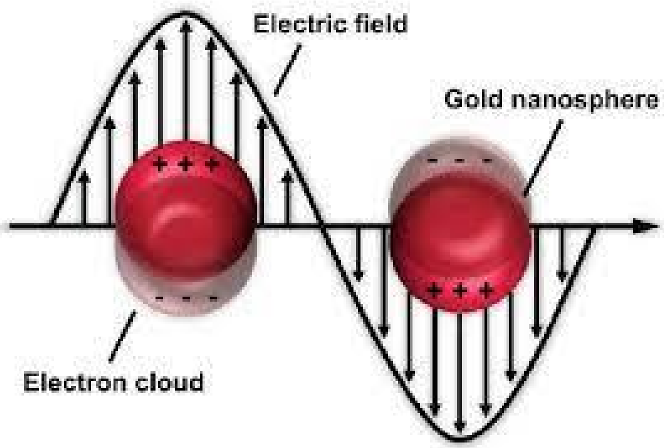


Direct bandgap semiconductors



Indirect bandgap semiconductors

NANOPARTICELLE METALLICHE E RISONANZA PLASMONICA[2]



NANOPARTICELLE METALLICHE E RISONANZA PLASMONICA²

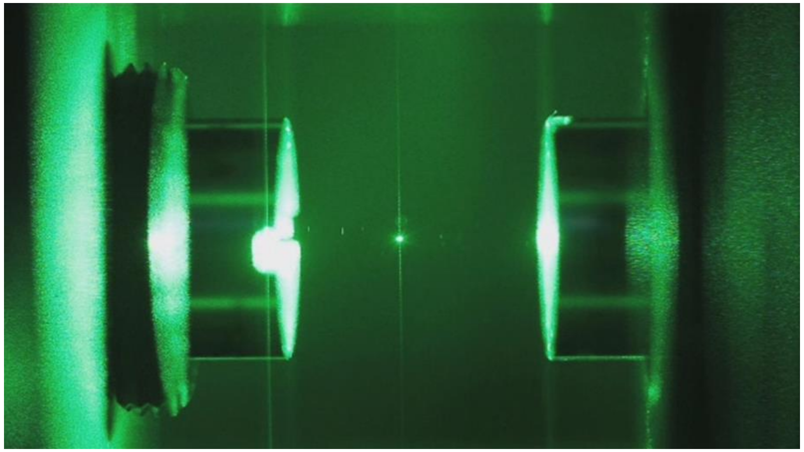
$$\rho(\mathbf{r})c(\mathbf{r})\frac{\partial T(\mathbf{r},t)}{\partial t} = \nabla k(\mathbf{r})\nabla T(\mathbf{r},t) + Q(\mathbf{r},t)$$

$$Q(\mathbf{r},t) = \langle \mathbf{j}(\mathbf{r},t) \cdot \mathbf{E}(\mathbf{r},t)\rangle_t$$

$$\Delta T(\mathbf{r}) = \frac{V_{NP}Q}{4\pi k_0 r}$$

$$Q = \frac{\omega}{8\pi}E_0^2\left|\frac{3\epsilon_0}{2\epsilon_0 + \epsilon_{NP}}\right|^2 Im(\epsilon_{NP})$$

SI PUÒ AVERE ANCHE RAFFREDDAMENTO?[3]



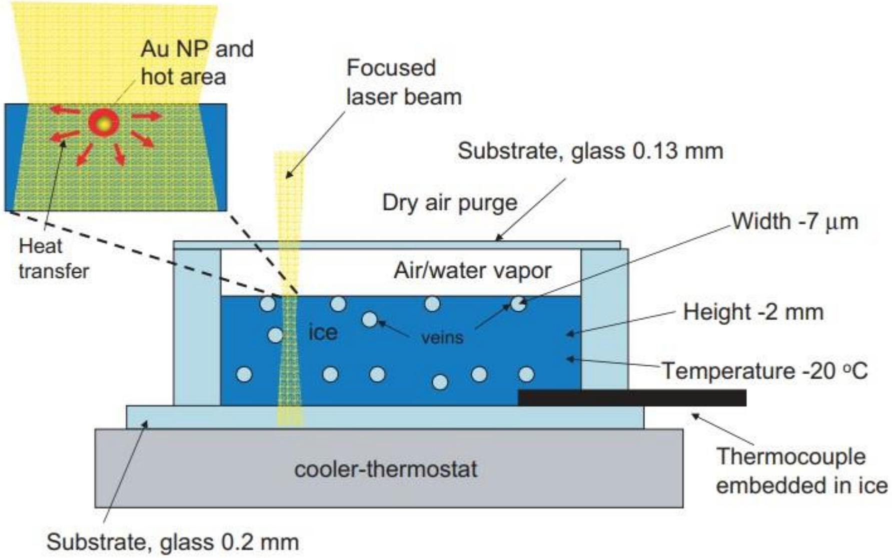
SI PUÒ AVERE ANCHE RAFFREDDAMENTO?[3]

$$\gamma_{eff} = \gamma + \frac{\beta(\Delta)}{2m} \frac{2\kappa}{(2\kappa)^2 + \omega_M^2}$$

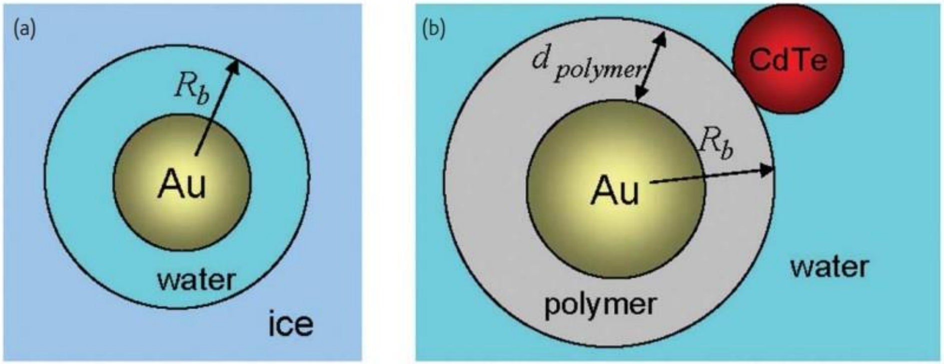
$$\kappa = \frac{\pi c}{2FL}$$

$$\Delta_x = \frac{L\Delta}{\omega_l}$$

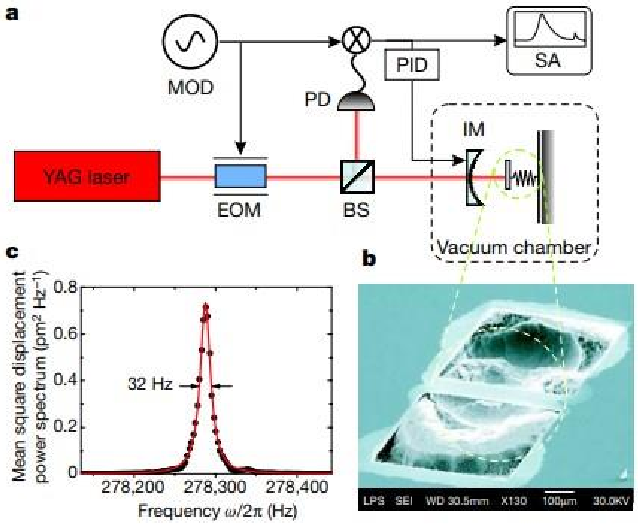
GENERATING HEAT WITH METAL NANOPARTICLES[2]



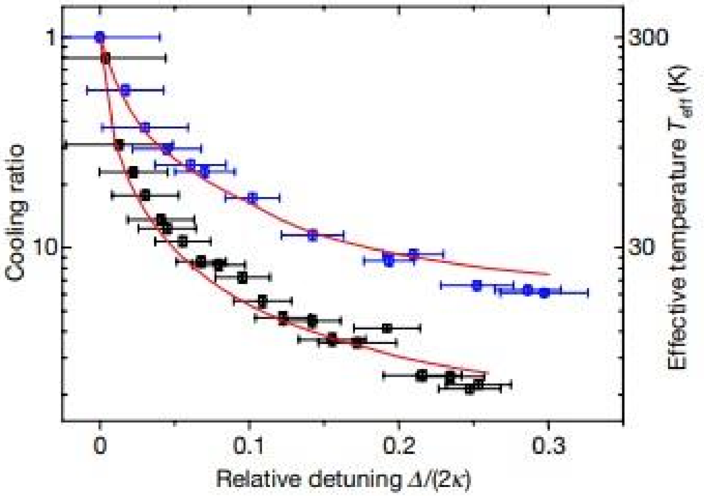
GENERATING HEAT WITH METAL NANOPARTICLES[2]



SELF-COOLING OF A MICROMIRROR BY RADIATION PRESSURE[3]



SELF-COOLING OF A MICROMIRROR BY RADIATION PRESSURE[3]



CONCLUSIONI

È possibile presupporre un futuro utilizzo di questa tecnologia anche a livello industriale, soprattutto in seguito ad un miglioramento dell’efficienza e della scalabilità di questi processi.

RINGRAZIAMENTI

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BIBLIOGRAFIA

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