28/02/2023

$$\Gamma_{EELS} = \frac{2}{\hbar} |\alpha|^2 \frac{2k^3}{3} |\vec{E}^{ext}|^2$$

$$\alpha = \frac{i3}{2k^3}$$

$$\mathrm{Im}\{1/\alpha\} = -\frac{2k^3}{3}$$

$$\Gamma_{EELS} = \frac{1}{\hbar\pi} \left(\frac{2e\omega}{v^2\gamma}\right) f\left(\frac{\omega b}{v\gamma}\right) \mathrm{Im}\{\alpha_{sp}\}$$

$$f(\zeta) = K_1^2(\zeta) + K_0^2(\zeta)/\gamma$$

$$\alpha_{sp} = a^3 \left(\frac{\varepsilon - 1}{\varepsilon + 2}\right)$$

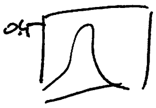
$$\vec{k}_{\parallel} \cdot (\vec{R} - \vec{R}_0)$$

$$\frac{e^{ik|\vec{r}-\vec{r}_0|}}{|\vec{r}-\vec{r}_0|}$$

our derivation

$\Gamma_{sp} =$

$\Gamma_{EELS} =$

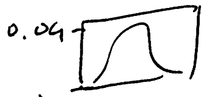


$\Gamma_{sp}/\Gamma_{EELS} \sim 1$

From #149 (dipole)

$\Gamma_{sp} = \dots$ $(\alpha_{sp} = (\dots))$

$\Gamma_{EELS} = \dots \mathrm{Im}\{\alpha_{sp}\}$ Eq. ( )



$\Gamma_{EELS}^{\#174} \ll \Gamma_{EELS}^{notes}$

$$(\vec{a} \otimes \vec{b})\vec{c} = \vec{a}(\vec{b} \cdot \vec{c})$$

$$\begin{pmatrix} (a_1 b_1) & (a_1 b_2) & (a_1 b_3) \\ (a_2 b_1) & (a_2 b_2) & (a_2 b_3) \\ (a_3 b_1) & (a_3 b_2) & (a_3 b_3) \end{pmatrix} \begin{pmatrix} c_1 \\ c_2 \\ c_3 \end{pmatrix}$$

$$\hat{\varepsilon}_p^- (\hat{\varepsilon}_p^+ \cdot \vec{p}) +$$

$$\vec{a} = (a_1, a_2, a_3)$$
$$\vec{b} = (b_1, b_2, b_3)$$

$$= \begin{pmatrix} a_1 (b_1 c_1 + b_2 c_2 + b_3 c_3) \\ a_2 (\quad) \\ a_3 (\quad) \end{pmatrix}$$

$$= \vec{a}(\vec{b} \cdot \vec{c})$$

$$(\vec{k}^2 + \vec{\nabla} \otimes \vec{\nabla}) (\; - \;)$$

$i\vec{k}$

$$k^2 (1 - \hat{k} \otimes \hat{k}) (\quad)$$

$$E^{ind} = G\, \vec{p}$$