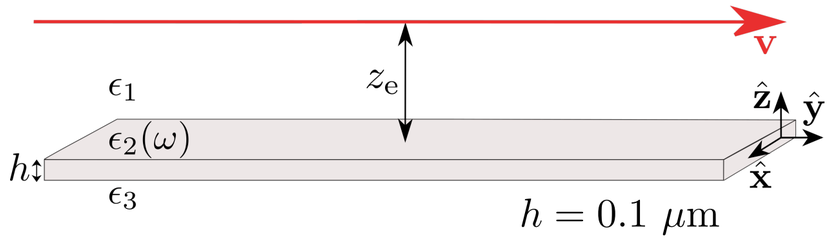
Electron coupling to a waveguide mode

$$\frac{\Gamma_\parallel(\omega,k_\parallel)}{L}=\frac{2e^2}{\pi\hbar v^2}\frac{k\,\mathrm{e}^{-2k_\parallel z_\mathrm{e}}}{\sqrt{k_\parallel^2-\omega^2/v^2}}[\mathrm{Im}\{r^\mathrm{s}_{123}(k_\parallel)\}+\mathrm{Im}\{r^\mathrm{p}_{123}(k_\parallel)\}],\ r^\nu_{123}=r^\nu_{12}+\frac{t^\nu_{12}t^\nu_{21}r^\nu_{23}\mathrm{e}^{2\mathrm{i}k_{z2}h}}{1-r^\nu_{21}r^\nu_{23}\mathrm{e}^{2\mathrm{i}k_{z2}h}},$$



$\epsilon_2(\omega)$ Si from Aspnes