Wolfram Mathematica model for the calculation of efficiencies from metallic spheres for linearly polarized plane wave. Drude model (local response approximation) and Thomas-Fermi (non-local response approximation) models for the dielectric response are considered. The medium outside of the sphere is air with permittivity. The number of spherical harmonics is set to $m = 25$. For Drude model the dielectric constant $\varepsilon(\omega)$ is set to (see S.Maier eq. 1.27):

$$\varepsilon(\omega) = \varepsilon_\infty - \frac{\omega_\mathrm{p}^2}{\omega^2 + i\gamma\omega},$$

where ε_∞ is due to positive background of the ion cores, ω is the angulare frequency and γ is the damping rate, and the Mie coefficients are calculated using expressions in Bohren and Huffman (see eqs. 4.56 and 4.57 on page 103). The efficiencies are evaluated using Bohren and Huffman eqs. 4.61 and 4.62. For Thomas-Fermi model, I used the analytical model developed by Th. Christensen et al.

The below results are evaluated for $R = 5nm$ golden sphere, usng Thomas-Fermi model. The model is interactive and prompts for the imputs for the parameters.

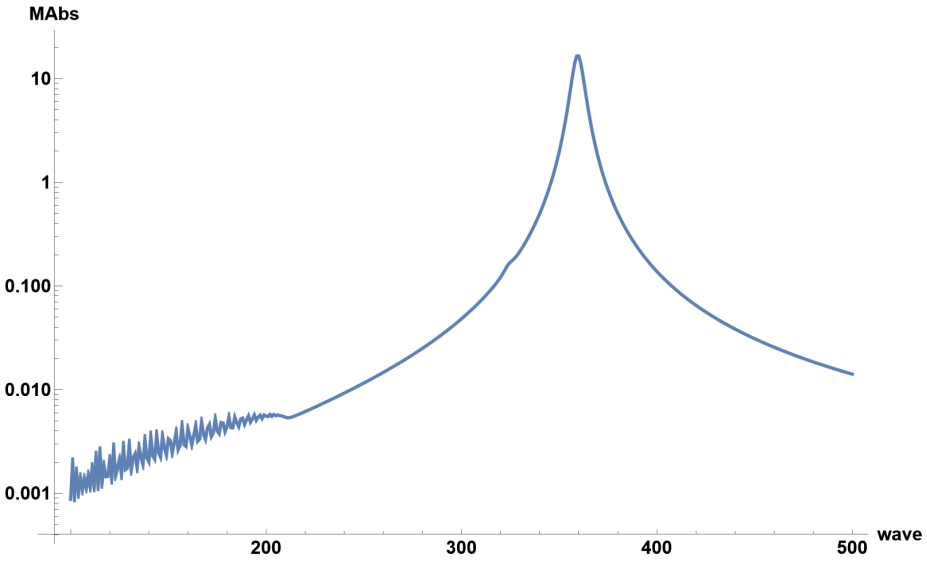

Figure 1: abs.png

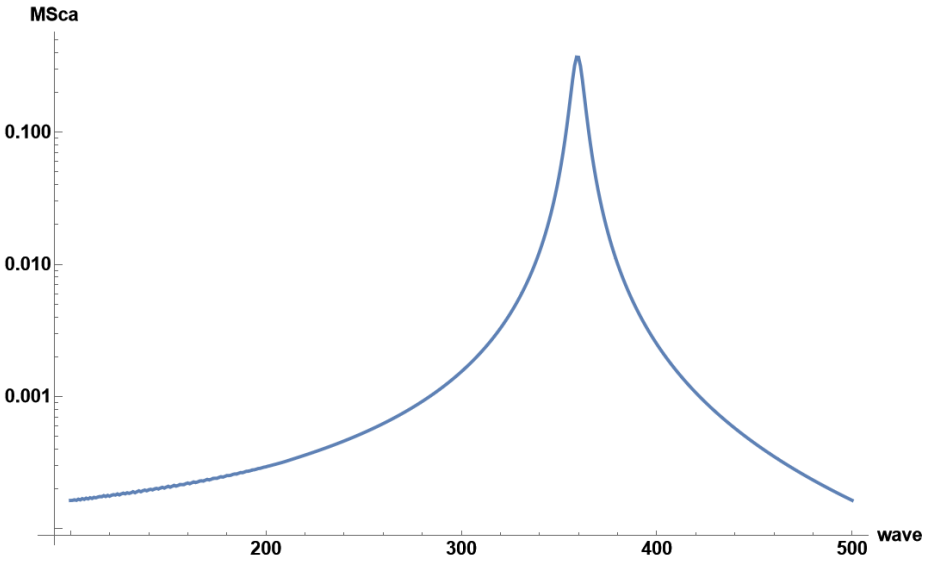

Figure 2: sca.png