4 layer model with an anisotropic half space (sheets)

electric permittivity given by Drude-Lorentz(DL) model:

isotropic polarizability of each free standing NP (using quasi-static dipolar approximation)

as half space is anisotropic then the dielectric permittivity perpendicular and parallel to the interface are different given by

due to light being comprised of s and p polarised light then the quasistatic polarizability can be expressed as

the image-charge screening factor for the film is given as (determined from potential derivation)

the lattice dependents parameters for a hexagonal lattice are given by

meaning that for the NP layer the parallel and perpendicular components correspond to

from the transfer matrix the reflection and transmittance can be calculated by

so

the transmittance requires a scaling factor however this is not reliable due to layer 4 being hyperbolic which requires more info the one here is the general one for isotropic L4 (non metal) so transmittance is ignored in all plots this can be included in a 5 layer system

then

where: