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Media

GSvit is based on use of a regular rectangular mesh, so we use e.g. 200x200x200 voxels on which our problem is defined. Individual voxels in the computational domain can be filled with any material.

Vacuum

Linear

Metals

There are the few different effects that we can observe when illuminating a nanoscale metallic structure. First of all, we can observe effect of spectral properties of the particular metal from which the structure is formed. Even the simplest possible quantity observed on metals in everyday life - its excellent reflectivity - is material dependent and the different appearance of different metals is its consequence. This can be handled via FDTD easily as there are many different algorithms enabling us to parametrize the spectral dependence of optical properties of metal and use them in the calculation. These algorithms also hide fact that the propagation of light through metal described only by its complex permittivity can't be handled easily via conventional grid spacing and time steps. An example of calculated metal reflectivity via FDTD for different metals and algorithms is shown in section Media.
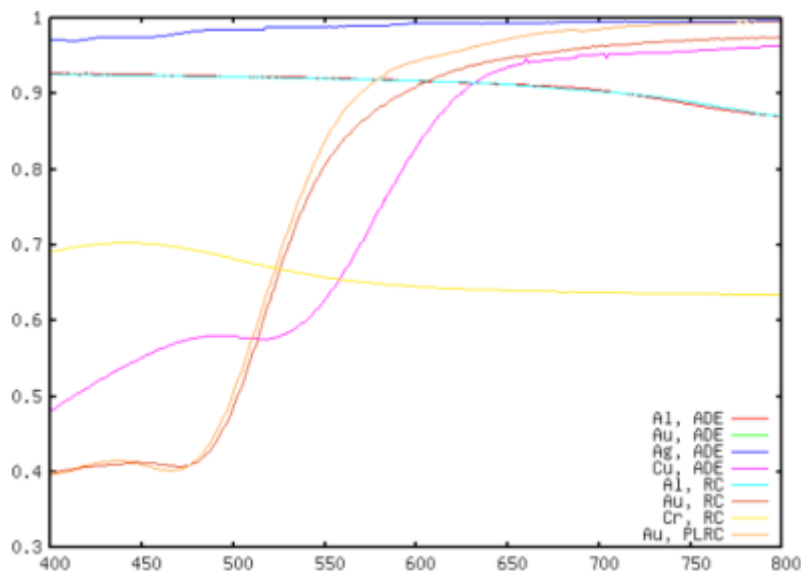
Spectral dependences of metal surface reflectivity for different materials and different numerical techniques. Note that Chromium curves are almost entirely identical (so that ADE curve is hidden behind the RC one), and also Aluminum curves are very similar. For gold, slightly different dispersive properties were used for RC and for ADE/PLRC technique, using those presented in original papers, so the curves are not expected to be identical. Also, PLRC and ADE result for gold is indistinguishable.

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