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Mie scattering

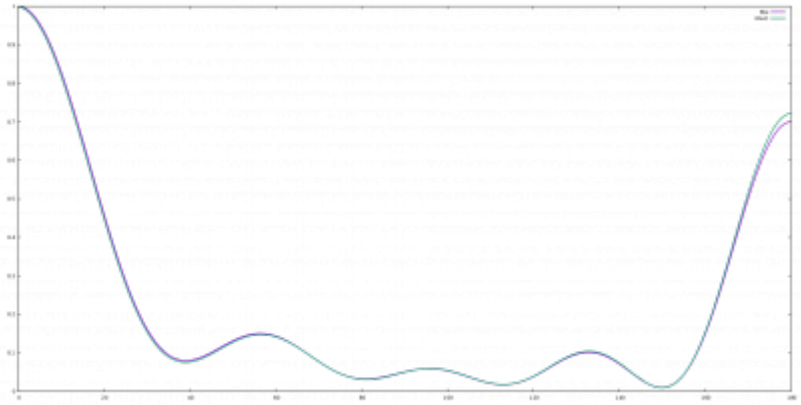
Scattering of monochromatic light by a homogeneous dielectric sphere is a traditional problem in the area of light-matter interaction. It has numerous applications, e.g. in aerosols measurements in environmental studies.

Calculation on a regular, smooth and homogeneous, sphere can be done using Mie's solution of Maxwell equations and there are numerous codes available for this, even online. However, we can use it to benchmark the performance of the near-field to far-field transform.

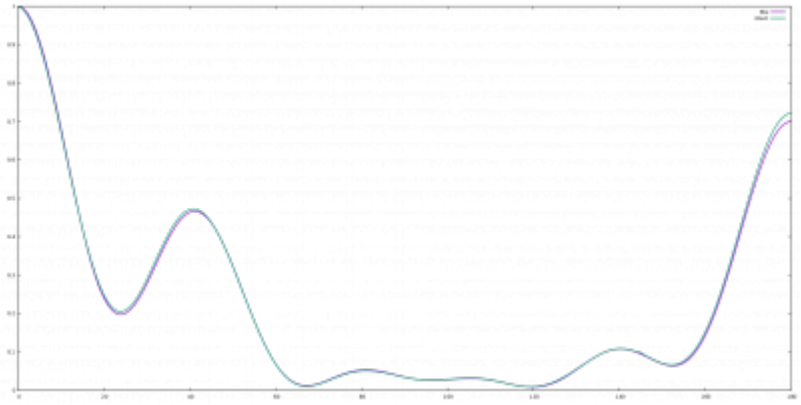
The figures below illustrate a good match between GSvit and Mie's solution calculated using the MieScatter package for Julia.

Nominal particle radius: 400 nm, wavelength: 633 nm, refraction index of the sphere material: 2.0.

Incident light polarized parallel to the scattering plane (scattered light therefore also polarized parallel):



Incident light polarized perpendicular to the scattering plane (scattered light therefore also polarized perpendicular):



Sample parameter file: mie scattering.
Perpendicularly polarized plane wave scattering on a dielectric sphere.