

Comparison of geometric optics and radiative transfer in discrete random media

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We will simulate multiparticle media composed of Gaussian particles with geometric optics (GO), and with radiative transfer (RT). The RT assumes the medium to be ergodic, whereas in the GO, rays are traced inside a static mesh. The goal is to study the difference between the light-scattering characteristics from an ergodic medium and a mesh presenting a discrete random medium. The studied medium will be spherical, densely packed, and composed of Gaussian particles.

Preliminary results of this work will be presented. The GO part will be carried out with the extended version of SIRIS4 [1,2]. The current implementation supports only one Gaussian particle, so the code needs to be reworked to support arbitrary meshes. The RT part of the work will be done by simulating scattering by Gaussian particle with SIRIS4. The output is then used as an input for a RT simulation, which can be computed with the same code.

References

- [1] Lindqvist, H., Martikainen, J., Rabinä, J., Penttilä, A., and Muinonen, K., 2018: Ray optics with inhomogeneous waves applied to scattering by ice crystals. *JQSRT*, in preparation.
- [2] Martikainen, J., Penttilä, A., Gritsevich, M., Lindqvist, H., and Muinonen, K., 2018: Spectral modeling of meteorites at UV-vis-NIR wavelengths. *JQSRT* **204**, 144–151