

# Internal fields in soot fractal aggregates

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Light scattering from carbonaceous-soot fractal aggregates is commonly described with the Rayleigh–Debye–Gans (RDG) approximation [1]. Based upon the assumption that the monomers of an aggregate are within the Rayleigh regime, this approximation treats scattering from the aggregate as if each monomer scatters the incident field only. That is, the RDG approximation neglects “internal multiple scattering” between the monomers of an aggregate. While many of the physical characteristics of soot aggregates appear to justify use of the RDG approximation, its range of validity for this purpose has long been in debate [2].

In this presentation, we investigate light scattering from simulated soot fractal aggregates using the Maxwell volume integral equation combined with the discrete dipole approximation (DDA). The fields present within the aggregate’s monomers are then compared to the analogs given by the RDG approximation. Through this comparison, new aspects to our understanding of how these aggregates scatter light is uncovered.

## References

- [1] Kerker, M., 1969: *The Scattering of Light and Other Electromagnetic Radiation*. Academic Press, New York, USA.
- [2] Sorensen, C. M., 2001: Light scattering by fractal aggregates. *Aerosol Sci. Technol.* **35**, 648–687.

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