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T-matrix calculations of fractal black carbon atmospheric aerosol particle optical scattering ANNA SMITH, DAVID BONESS, Physics Department, Seattle University — To better constrain global climate change computer models, and thereby to more fully understand the full extent of anthropogenic climate change, it is necessary to understand the physics of light scattering from those atmospheric aerosol particles that are caused by human activities. The IPCC AR4 report on the physical basis of climate change lists uncertainty in the effects of black carbon aerosol particles, caused by burning fossil fuels and organic matter, as one of the greatest uncertainties in current climate change understanding. This study hopes to increase the knowledge of how aerosols contribute to radiative forcing by using more realistic modeling of scattering properties. We use D. W. Mackowski's T-matrix code on fractal aggregates of uniform spherical monomers and compare this with fractal scattering predicted by the Raleigh-Debye-Gans approximation. The T-matrix code is checked for accuracy with one spherical particle as found with Mie theory. Scattering properties found using the T-matrix method are performed as a function of fractal dimension and number of monomers. Preliminary results will be presented. Future work will involve comparison with soot particle optical scattering measurements made at Seattle University.

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