Modelling molecular cloud scattering using dust aggregates

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Mid-Infrared (MIR) observations and scattering models of molecular clouds have shown the existence of micrometer-sized particles in molecular clouds that are responsible for the so-called coreshine. Coreshine has been explained as the scattering of stellar radiation by micrometer-sized particles in molecular cloud cores and is a probe for the largest size population of dust particles in the interstellar medium. Since dust grains stick together to form aggregates of the grains which have inevitably different optical properties than the individual grains, it is important to model the MIR scattering using aggregates of different sizes. Here, we consider a simple spherical geometry of a molecular cloud consisting of dust aggregates, illuminated by an embedded source in order to predict the scattered intensities for different density distributions. Using freely available radiative transfer codes such as radmc3d and SKIRT, we also model the polarised intensities associated with such a model and study the dependence of polarisation in different dust distributions.