

PHYS332: Instructions for Project 1:
Monte-Carlo Radiative Transfer

Model the propagation of radiation inside a structured molecular cloud, quantifying the change of the radiation field with viewing direction and density contrasts. This problem is relevant for e.g. estimating chemical reaction rates for molecule (and eventual planet) formation in protostellar clouds (the reaction rates depend on the ambient radiation field). The core of the technique is a reverse Monte-Carlo method for tracing photon packages (see Bethell et al. 2004, specifically Appendix A). Test clouds are described in Mathis et al. (2002), section 2.

Goal: generate maps, or a "fly-through" through a molecular cloud, with the "sky" calculated at each camera position.