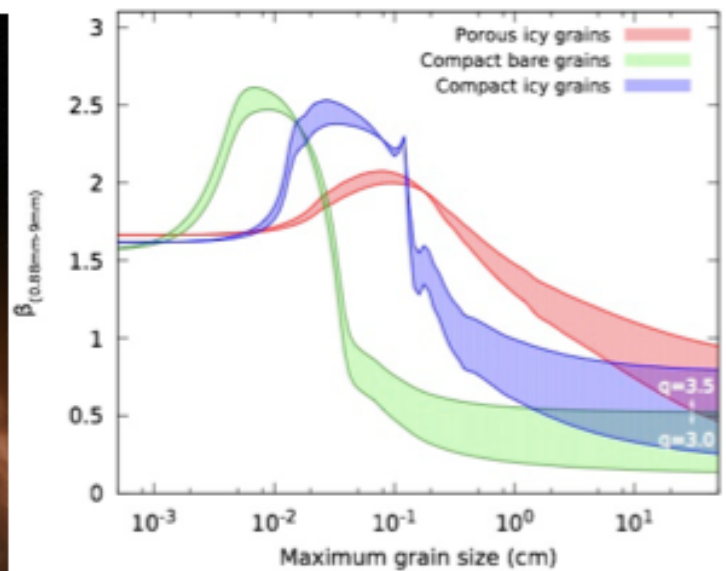
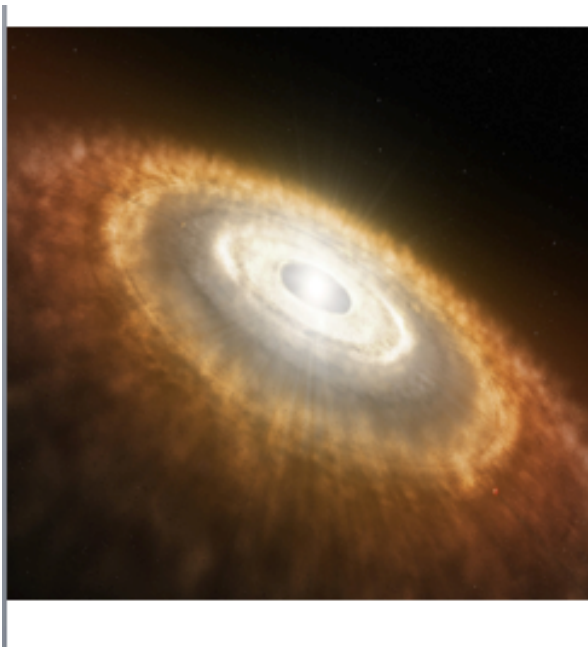


AST 300B – Spring 2017
In-class Problem Due: Friday Feb. 17

22. Consider an optically thin dusty disk surrounding a young protostar with luminosity L_{star} . In this problem, you will derive how the temperature of dust grains varies with distance from the star.

(a) Assume the dust opacity at long wavelengths is given by a power-law $Q_{\text{abs}} \sim \nu^\beta$. Derive the dependence of T_d with r and β .

(b) In typical ISM dust $\beta \sim 2$, but in protostellar disks where dust grain start to grow into planetesimals a more typical $\beta \sim 1$; what is the power-law index of T_d with r for the $\beta \sim 1$ found in disks?



Testi et al. 2013 PPVI Review