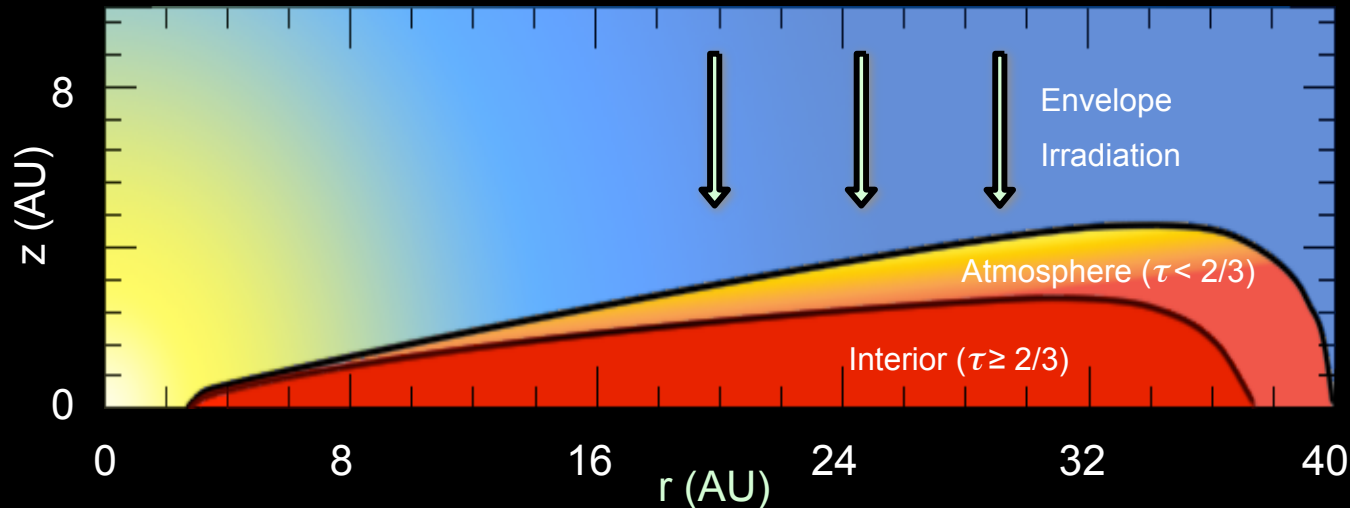


Gravitational Instabilities in Irradiated Protoplanetary Disks: 3D Radiative Hydrodynamic Simulations

Kai Cai



- Equatorial plane symmetry
- Radiative cooling in the atmosphere ($\tau_R < 2/3$)
- Flux-limited diffusion in the disk interior ($\tau_R \geq 2/3$)
- Irradiation: blackbody flux with T_{irr}
- D'Alessio et al. (2001) mean opacities (dust grains): a_{max} can vary ($n(a) \sim a^{-3.5}$, $a_{\text{min}} = 0.005 \mu\text{m}$)
- Recently improved by Cai, Durisen & Zhu: the use of J

Inner Disks (< 50 AU)

Recap: Discordant Numerical Results

Fragmentation

No Fragmentation

Latest Direct Comparison

Cai, Pickett, Durisen & Milne 2010

Boss 2007

