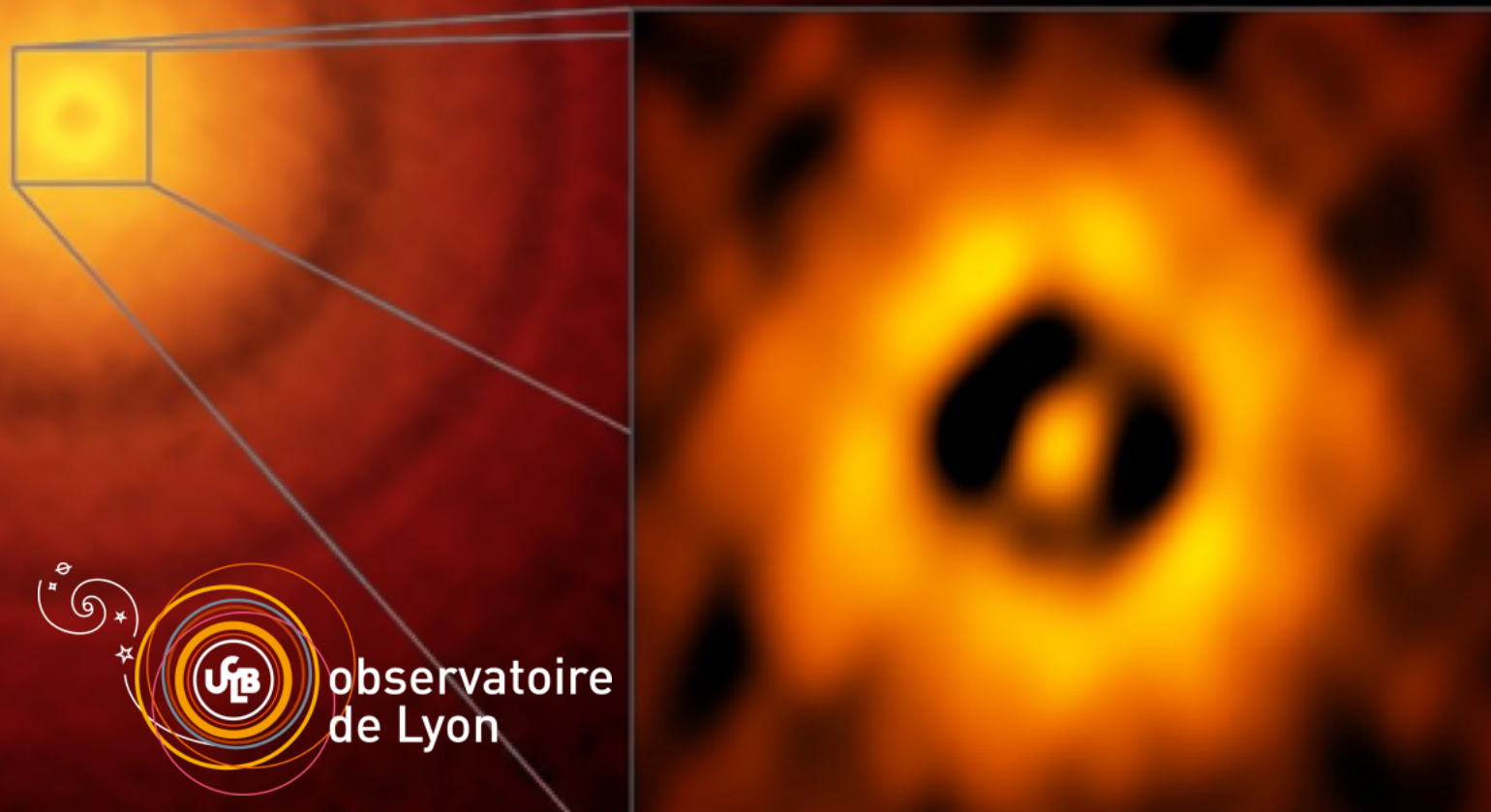


Cavity Size in Circumbinary Discs

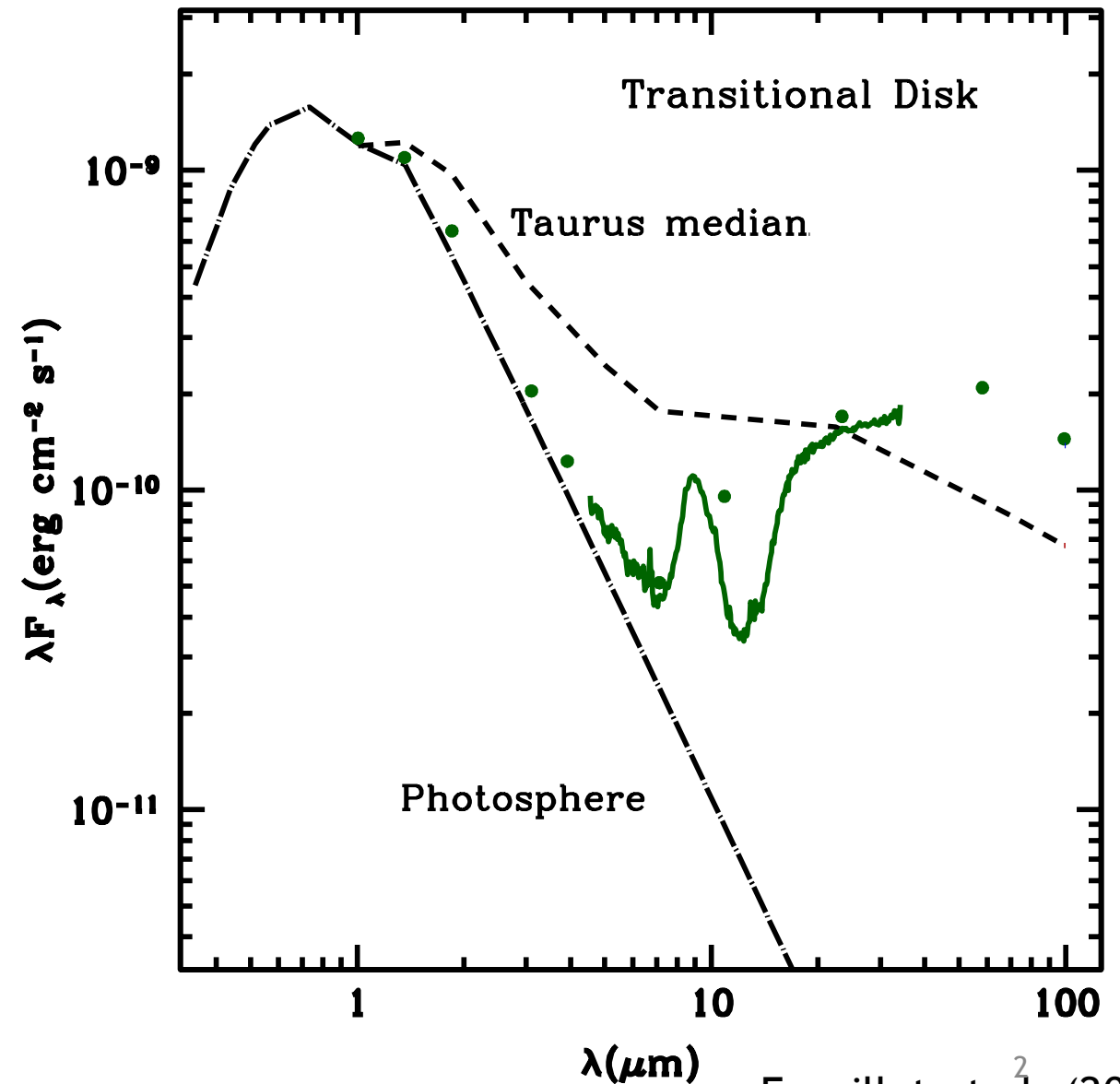
Kieran Hirsh

Daniel Price

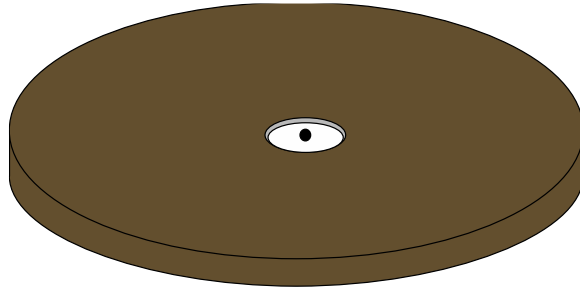


Transitional discs

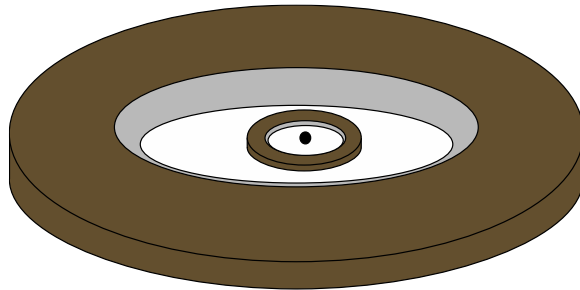
- Characterised by their spectral energy distribution (SED).
- Near infrared deficit compared to the median T Tauri.
- Empty cavity out to some large radius.



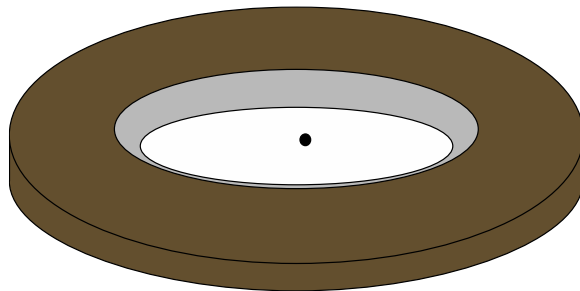
Transitional discs



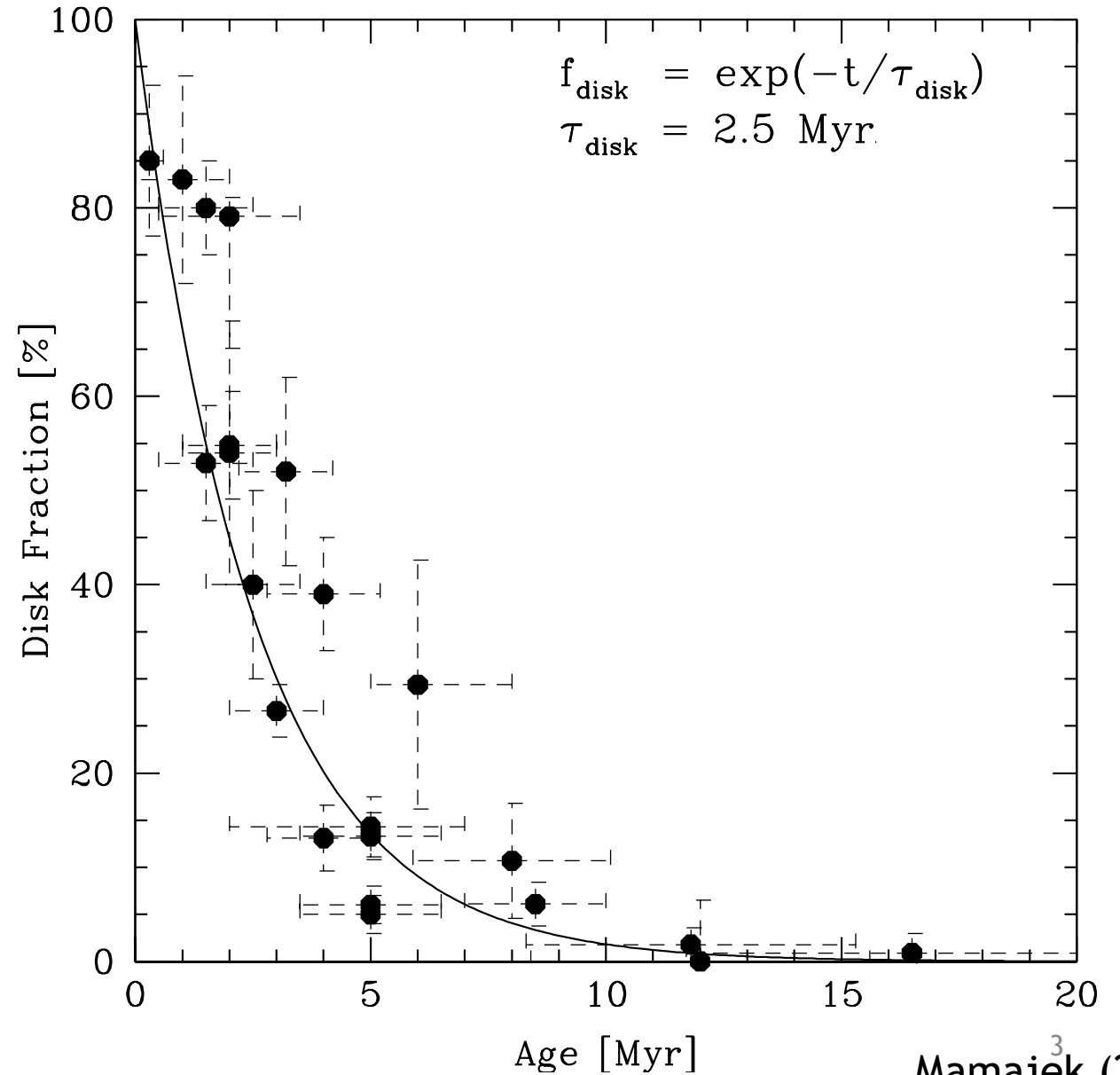
Full Disk



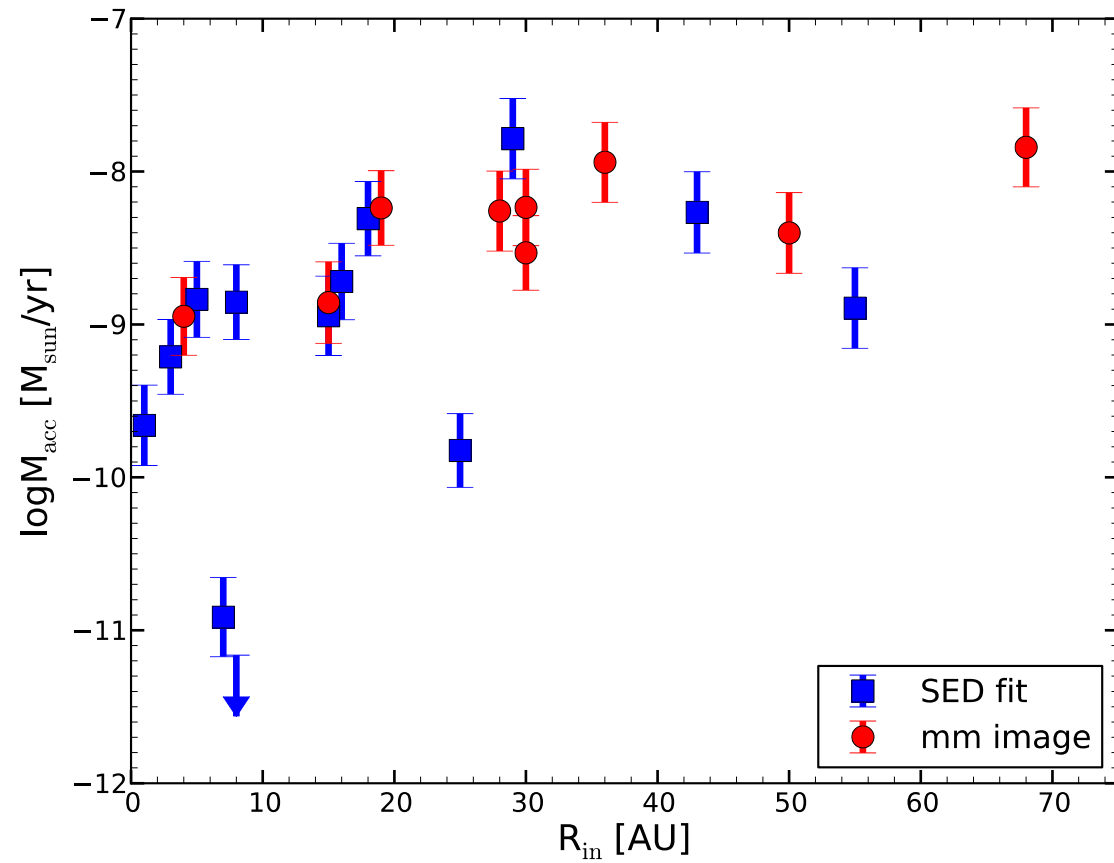
Pre-Transitional Disk



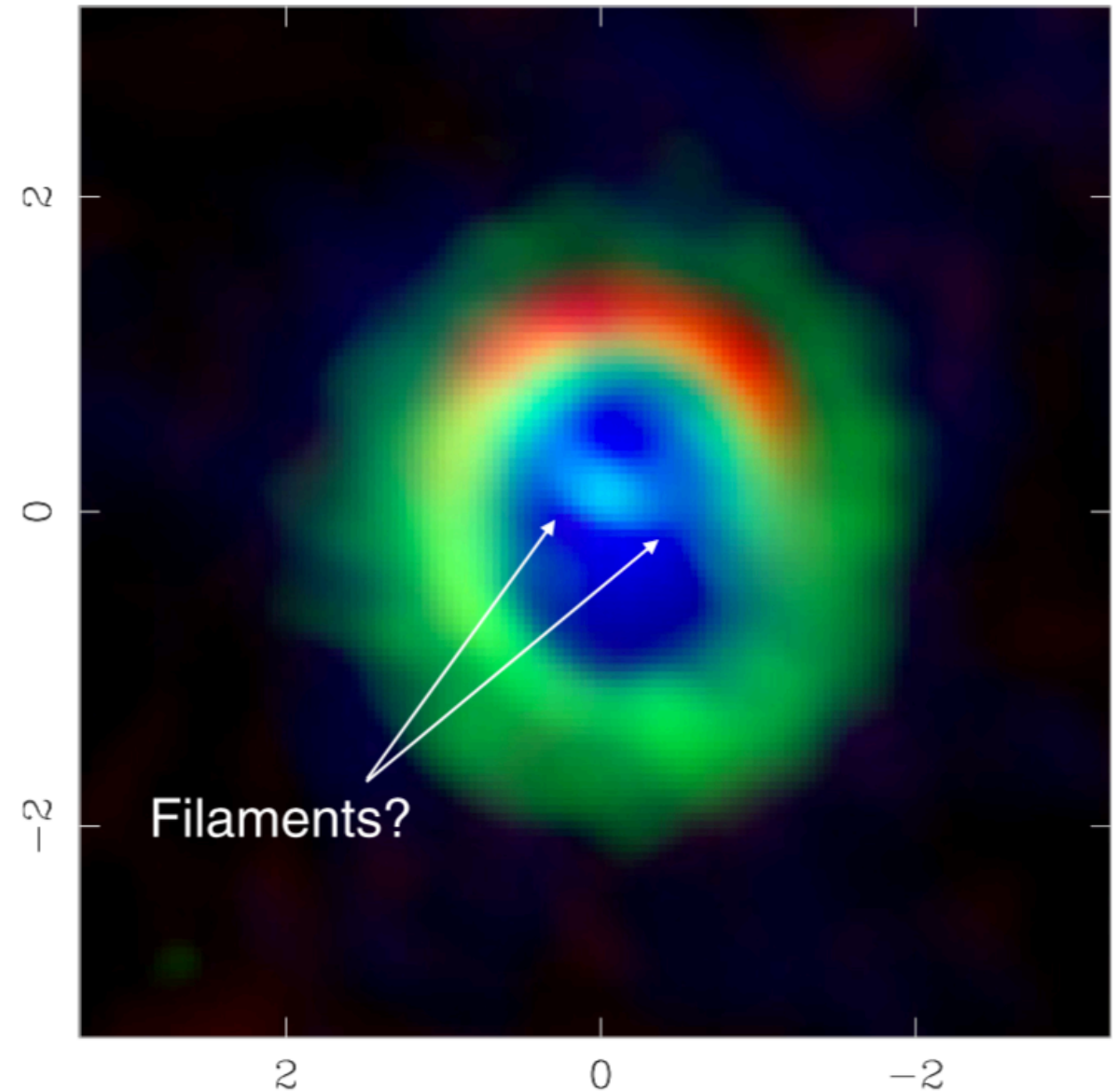
Transitional Disk



Binary Discs



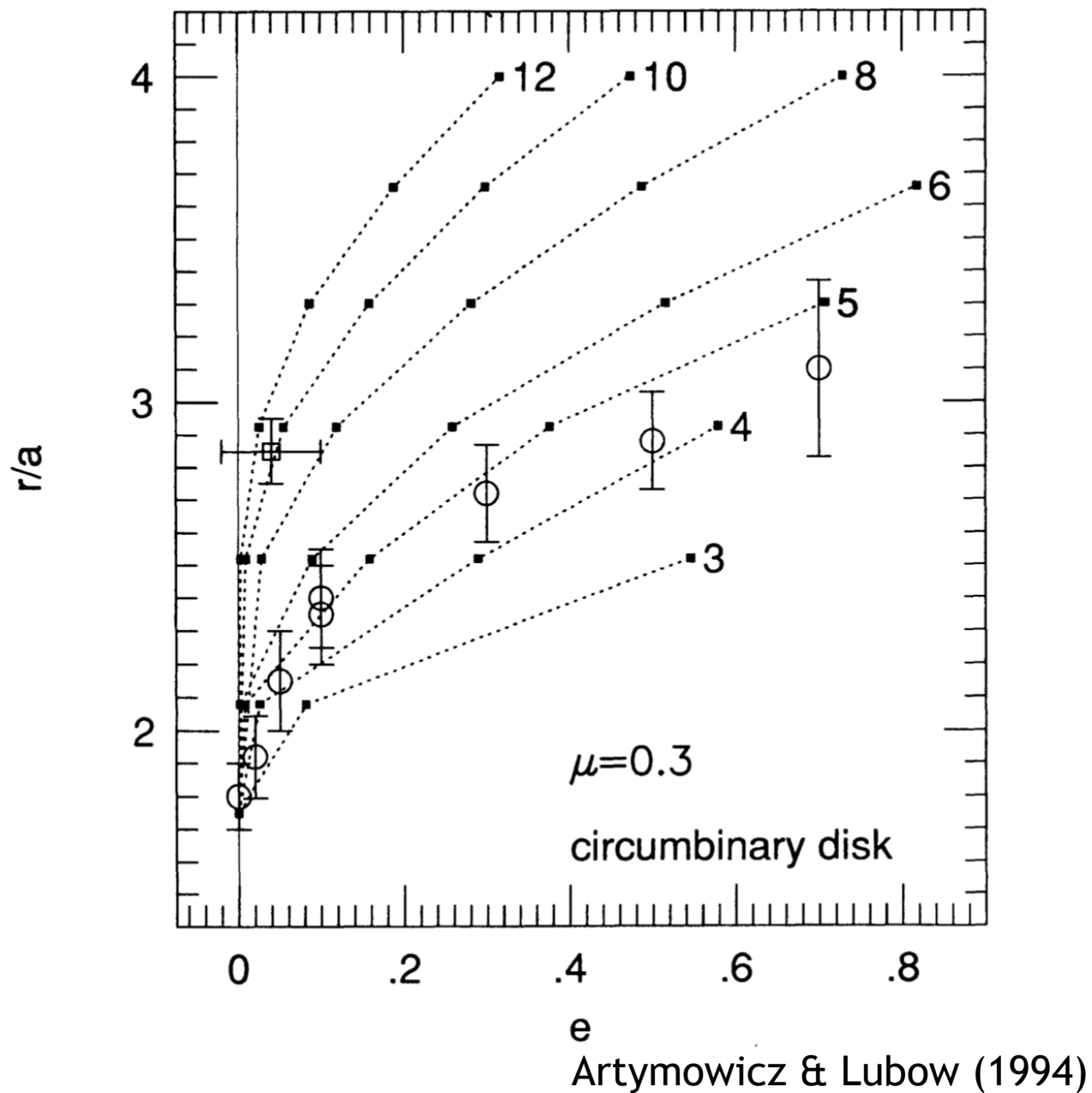
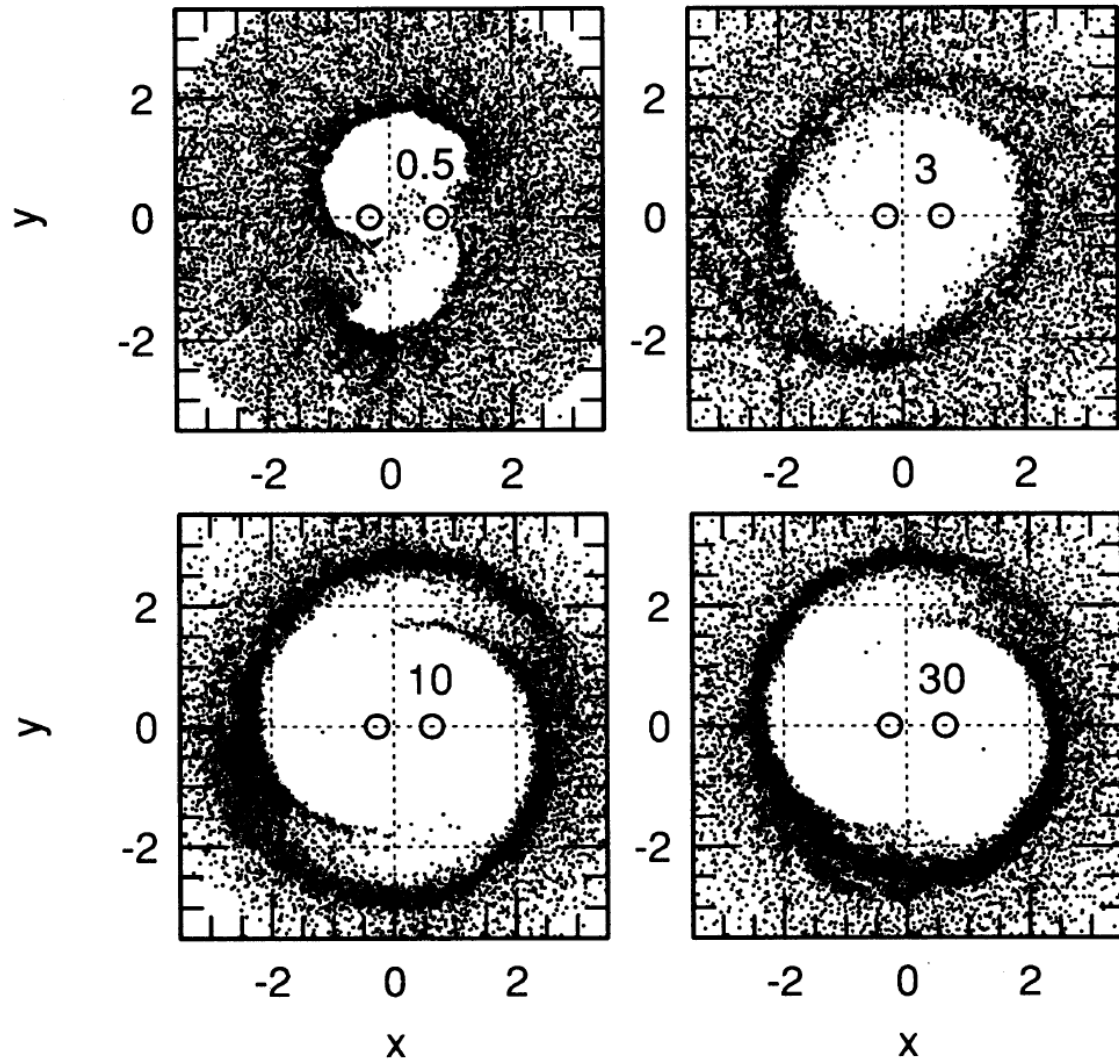
Manara et al. (2014)



HD 142527

Casassus et al. (2015)

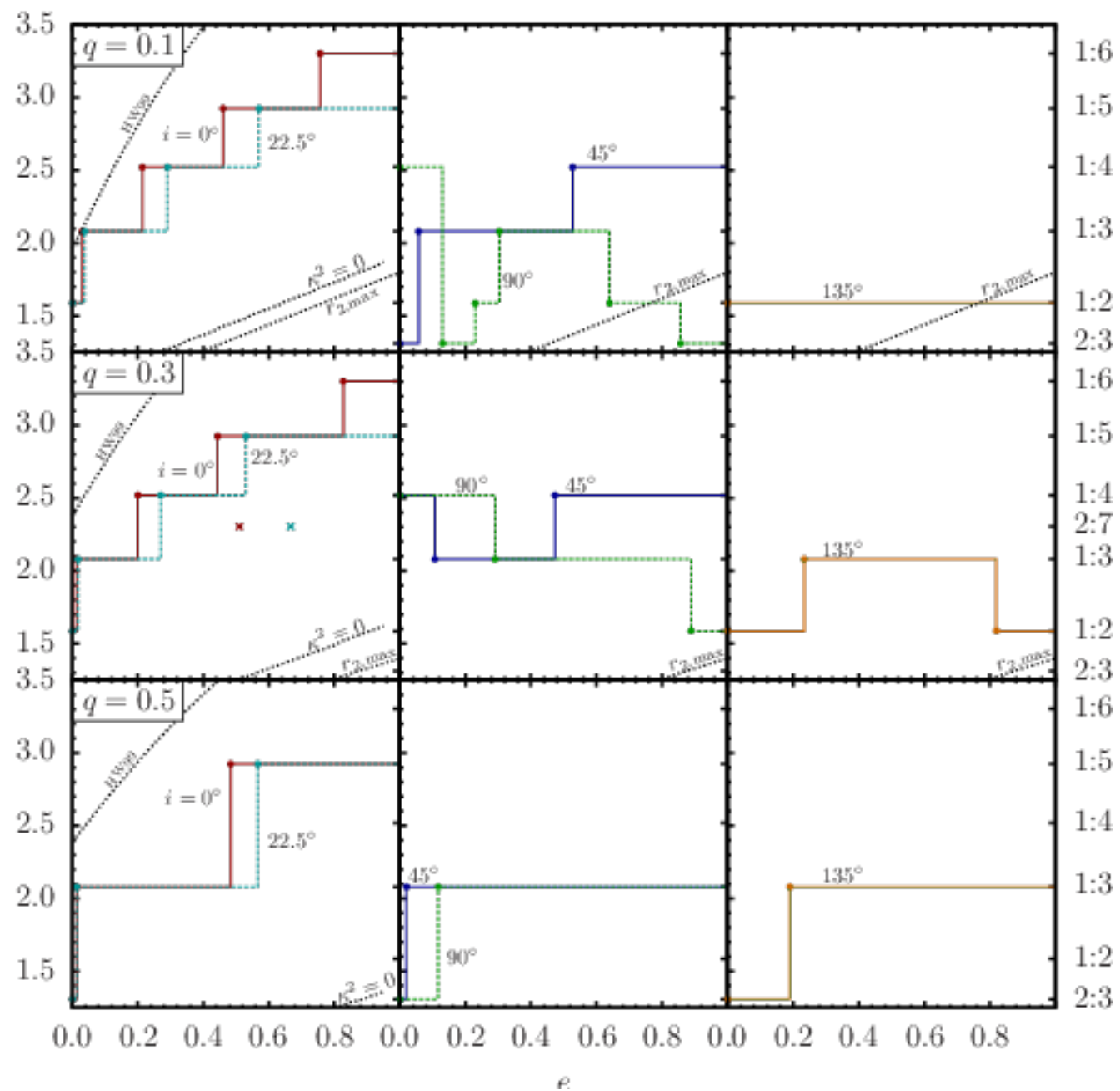
Binary Discs



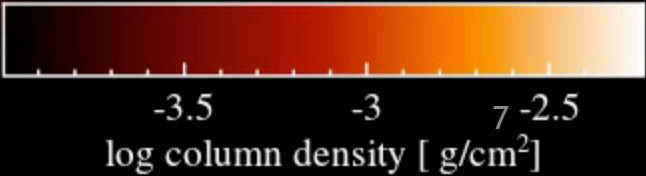
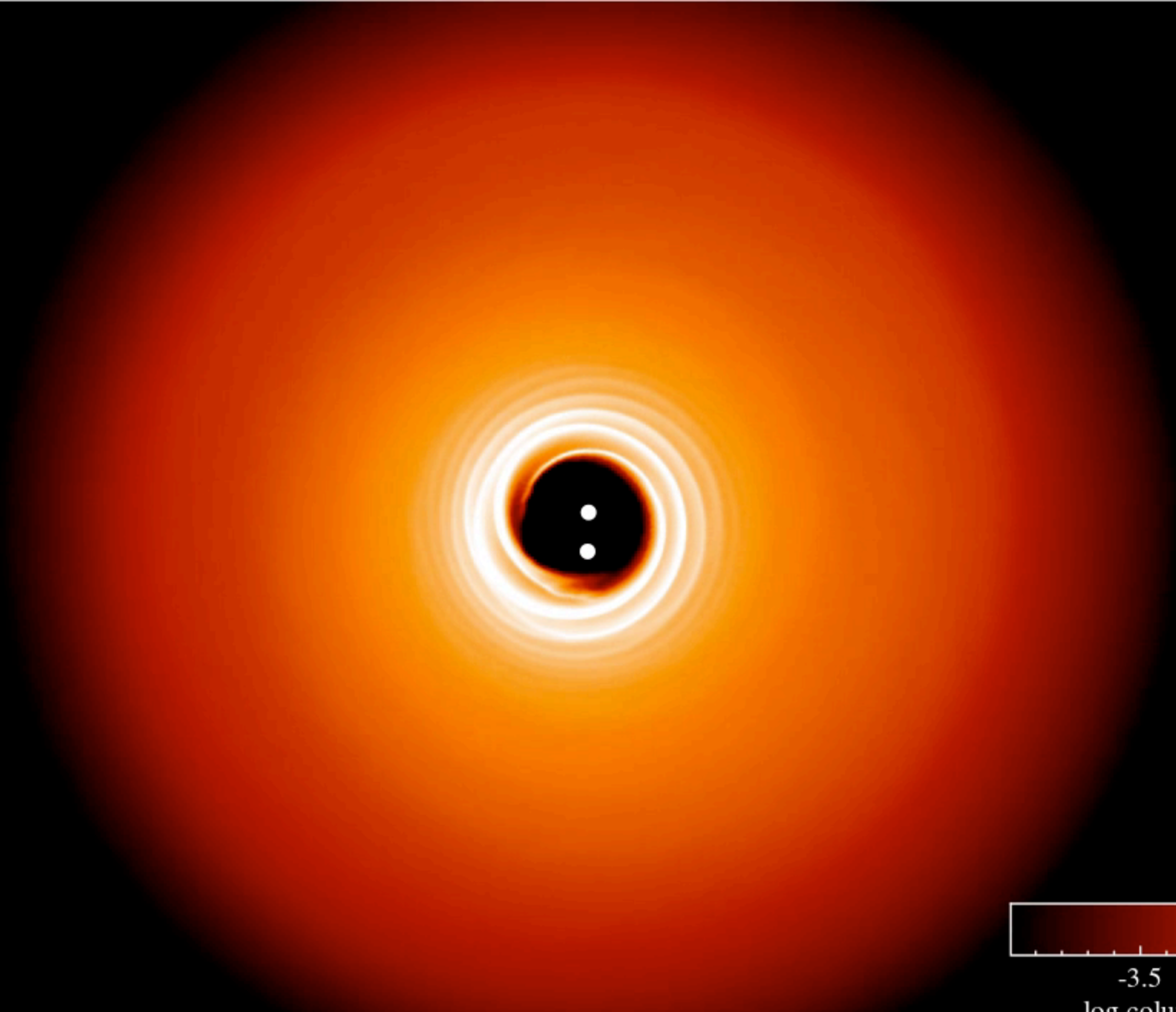
Binary Discs

$$-m\pi^2 \left[\Sigma \left(\frac{dD}{d \ln r} \right)^{-1} |\Psi_{m,N}|^2 \right] \gtrsim 3\pi\alpha h^2 \Sigma \Omega^2 r^4$$

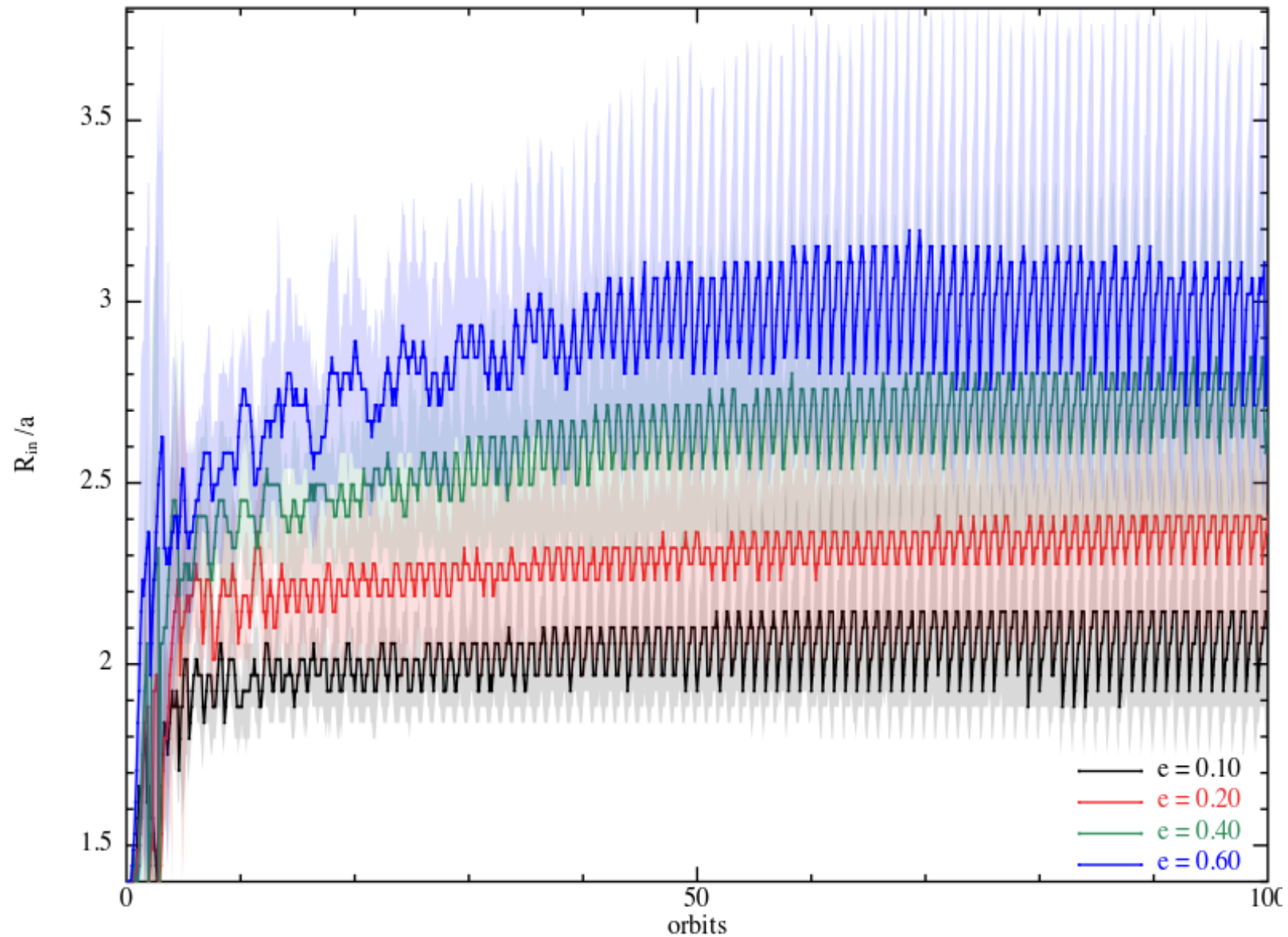
$$T_{m,N}^{LR} \gtrsim T_\nu$$



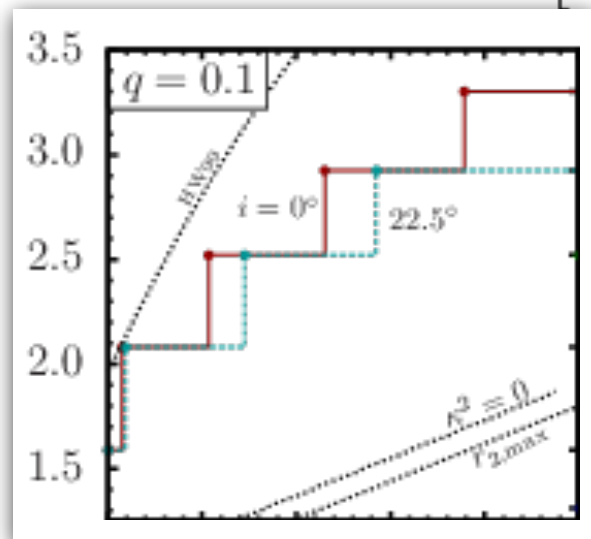
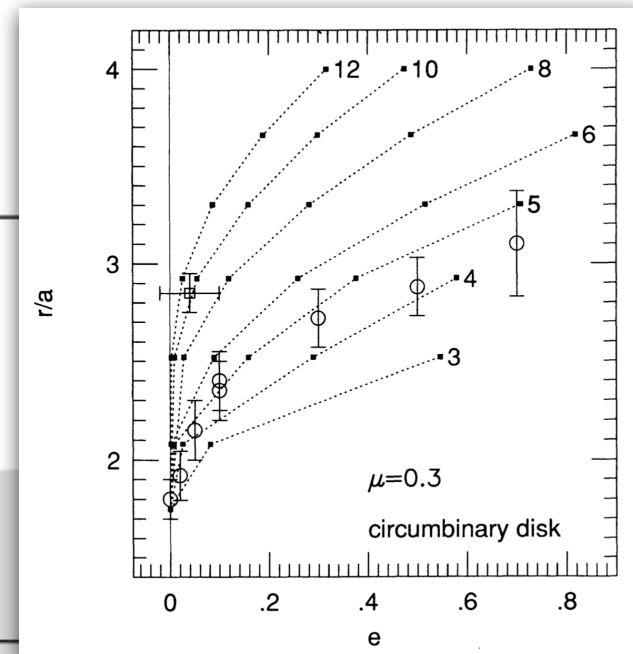
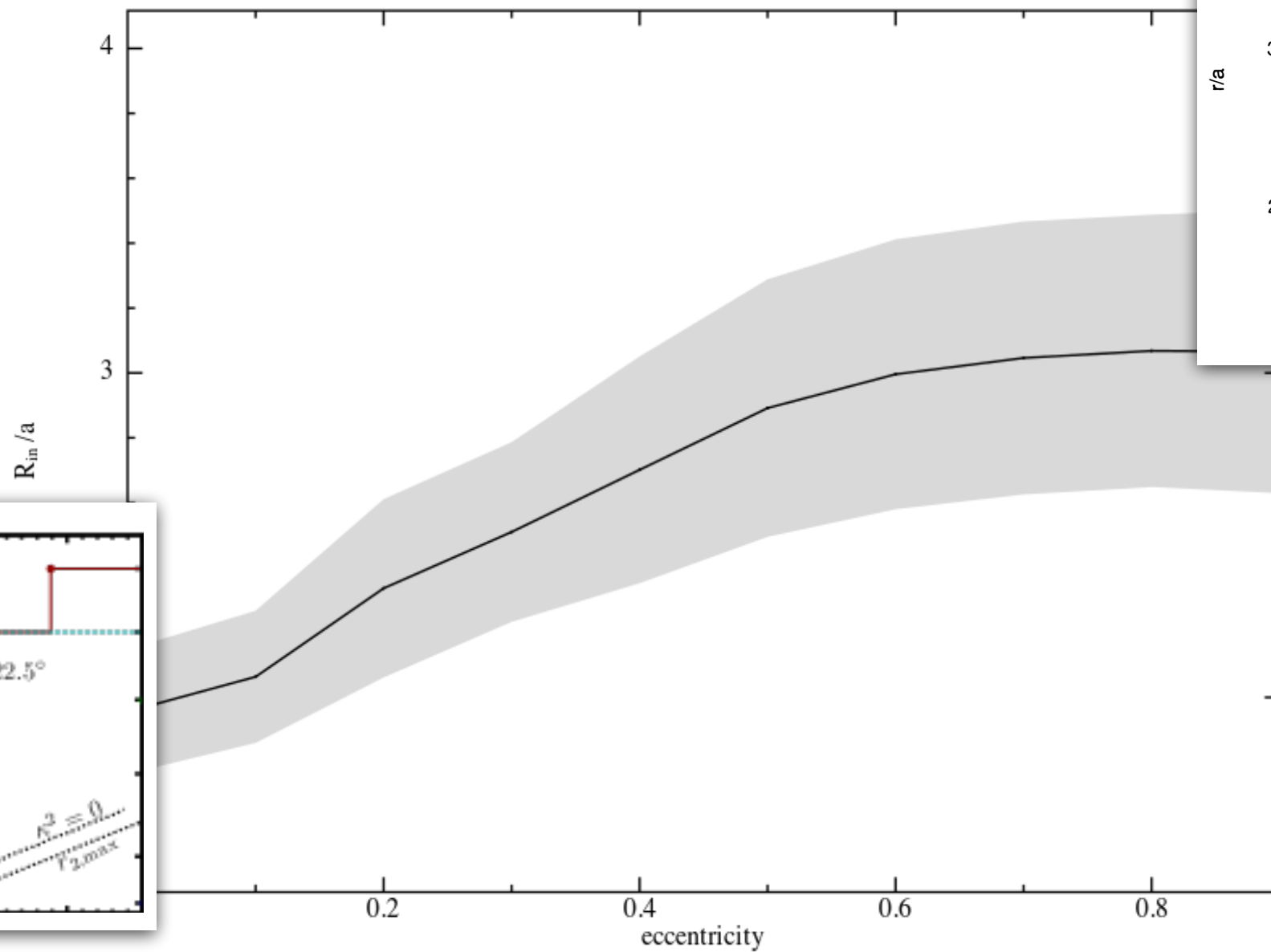
t=100 orbits



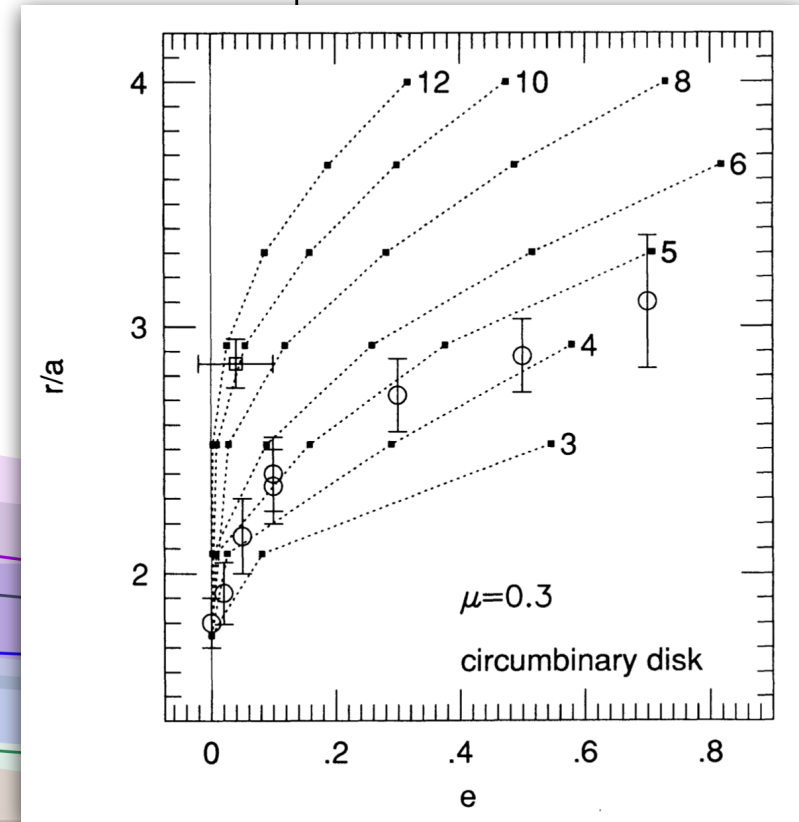
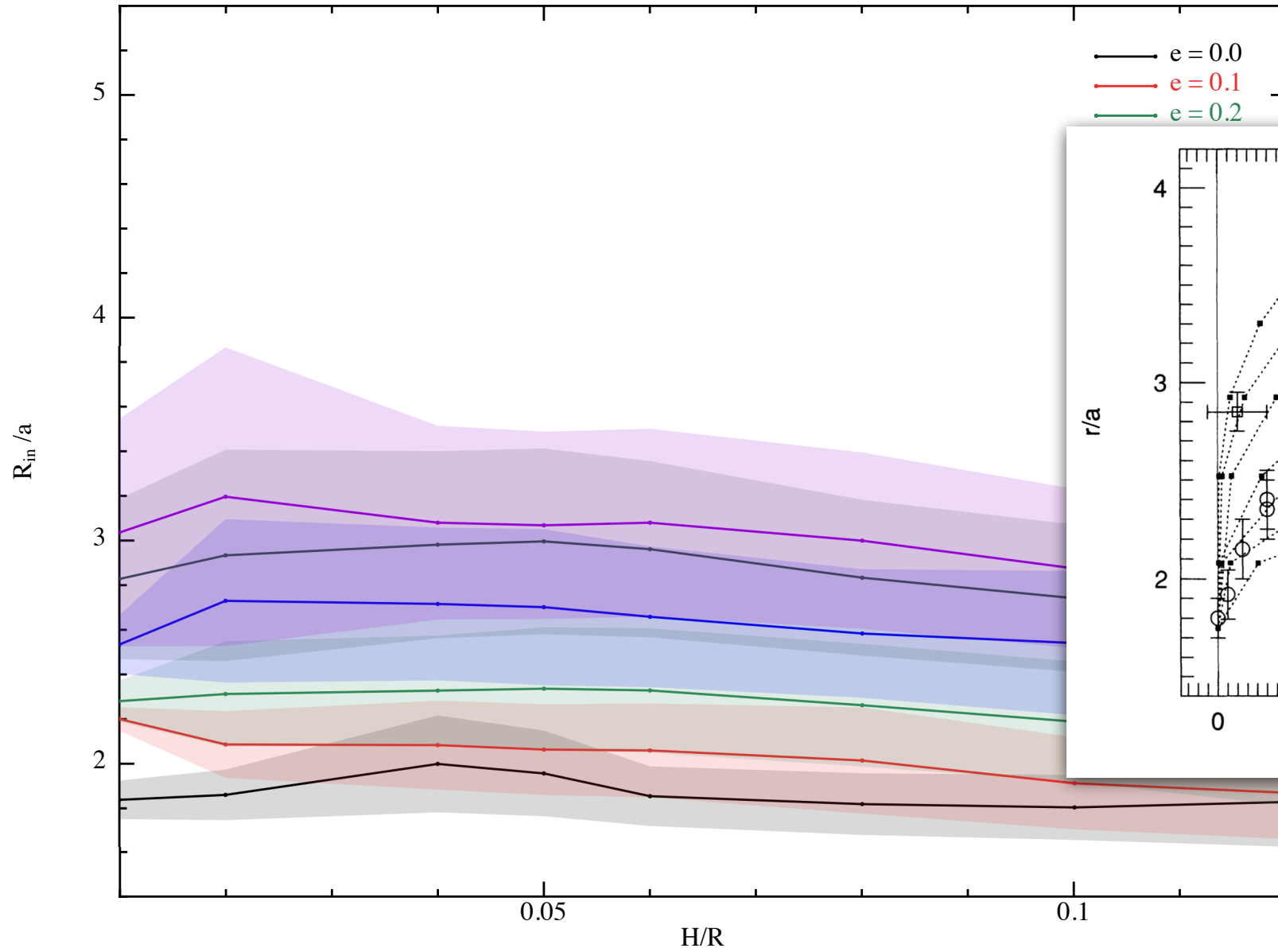
Time Evolution

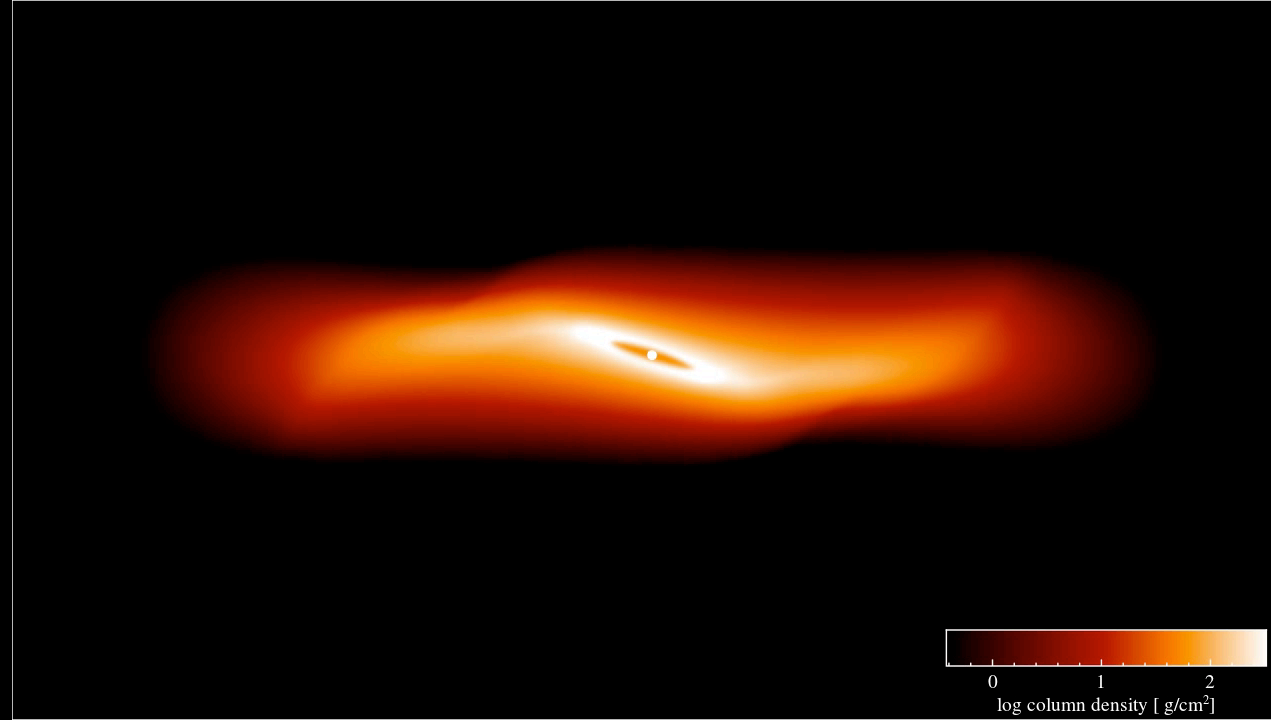
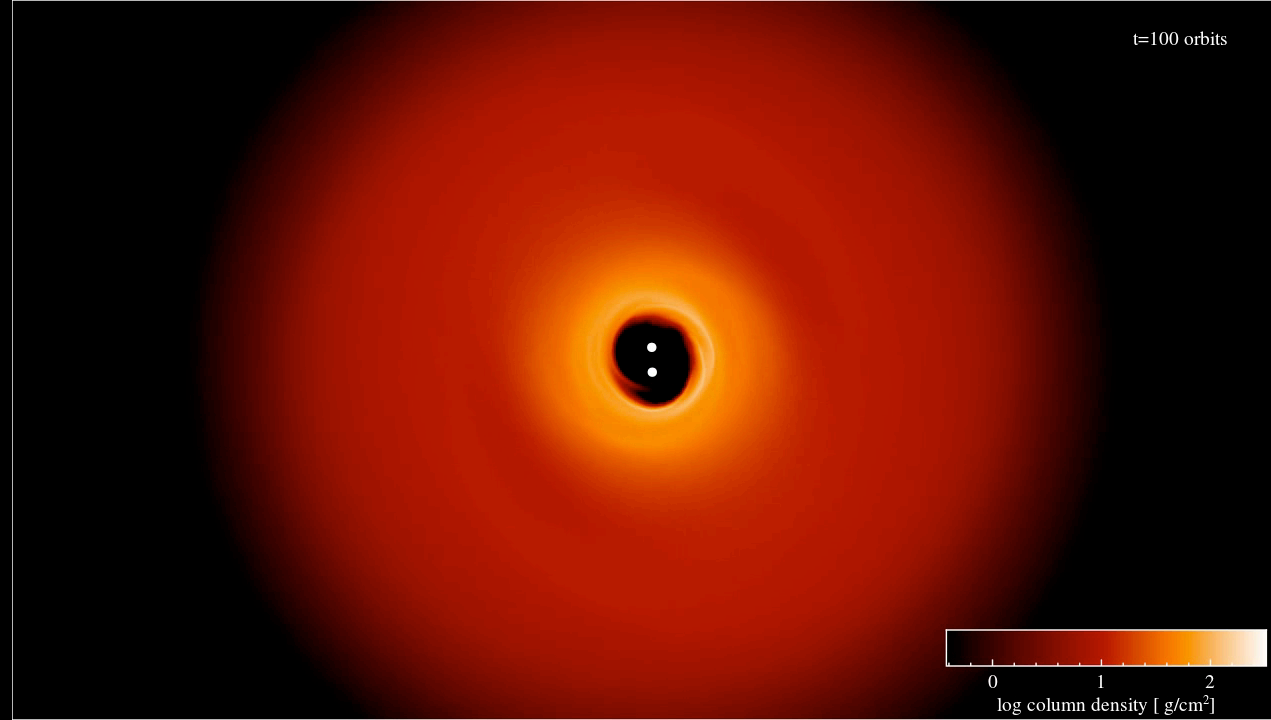


Eccentricity

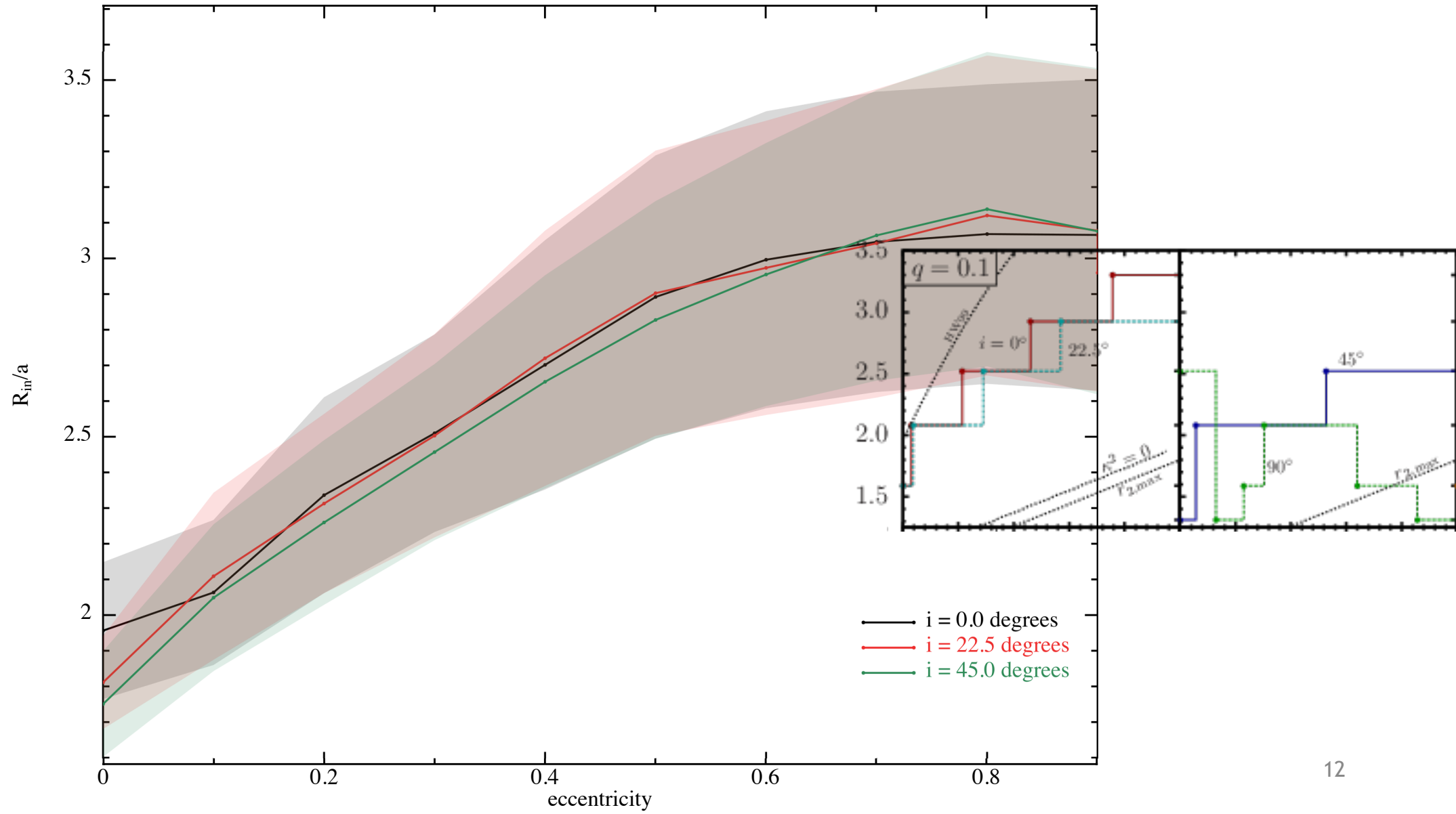


Scale Height





Inclination

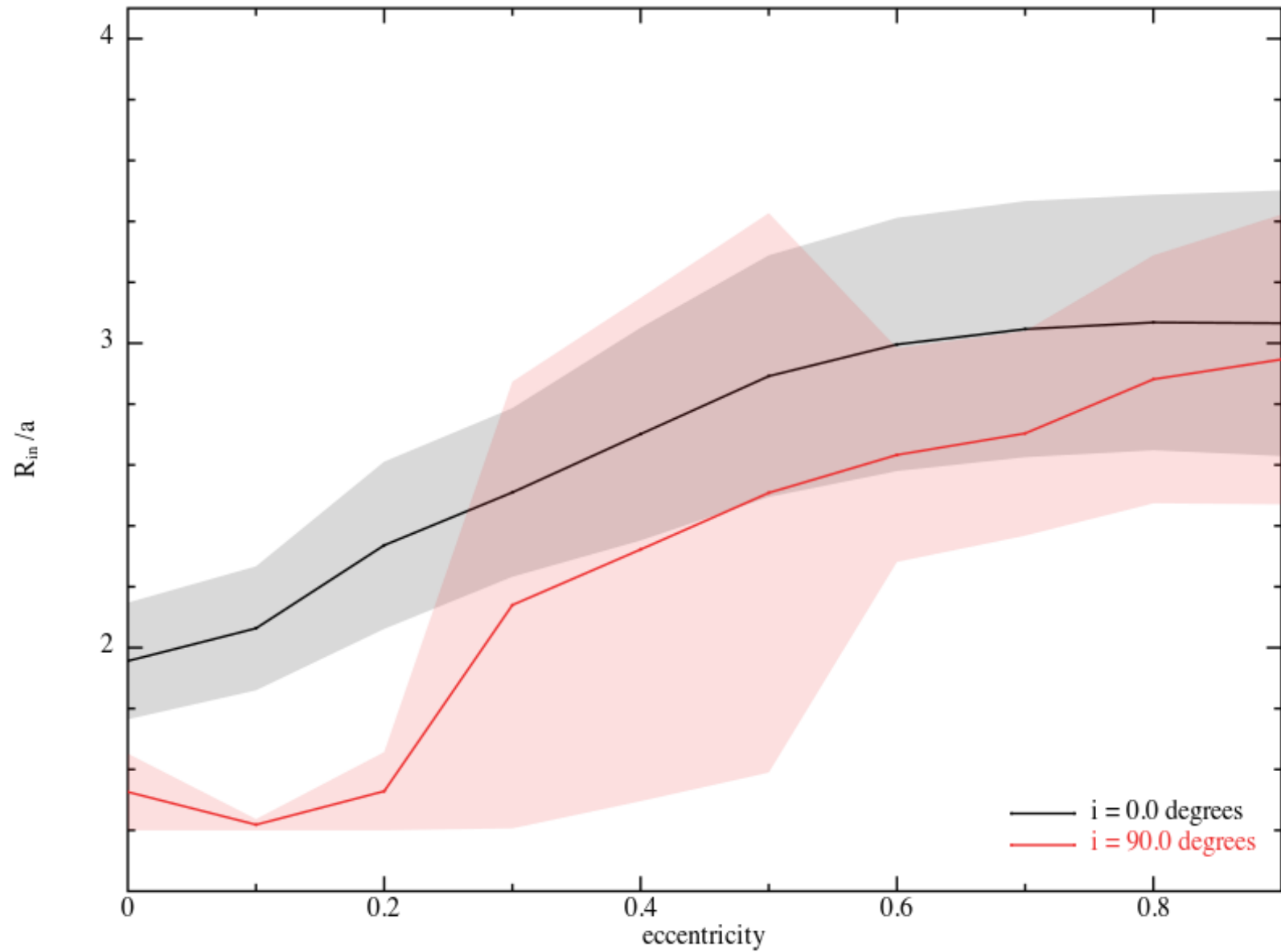


t=100 orbits



-3.5 -3 $10^{-2.5}$
log column density [g/cm²]

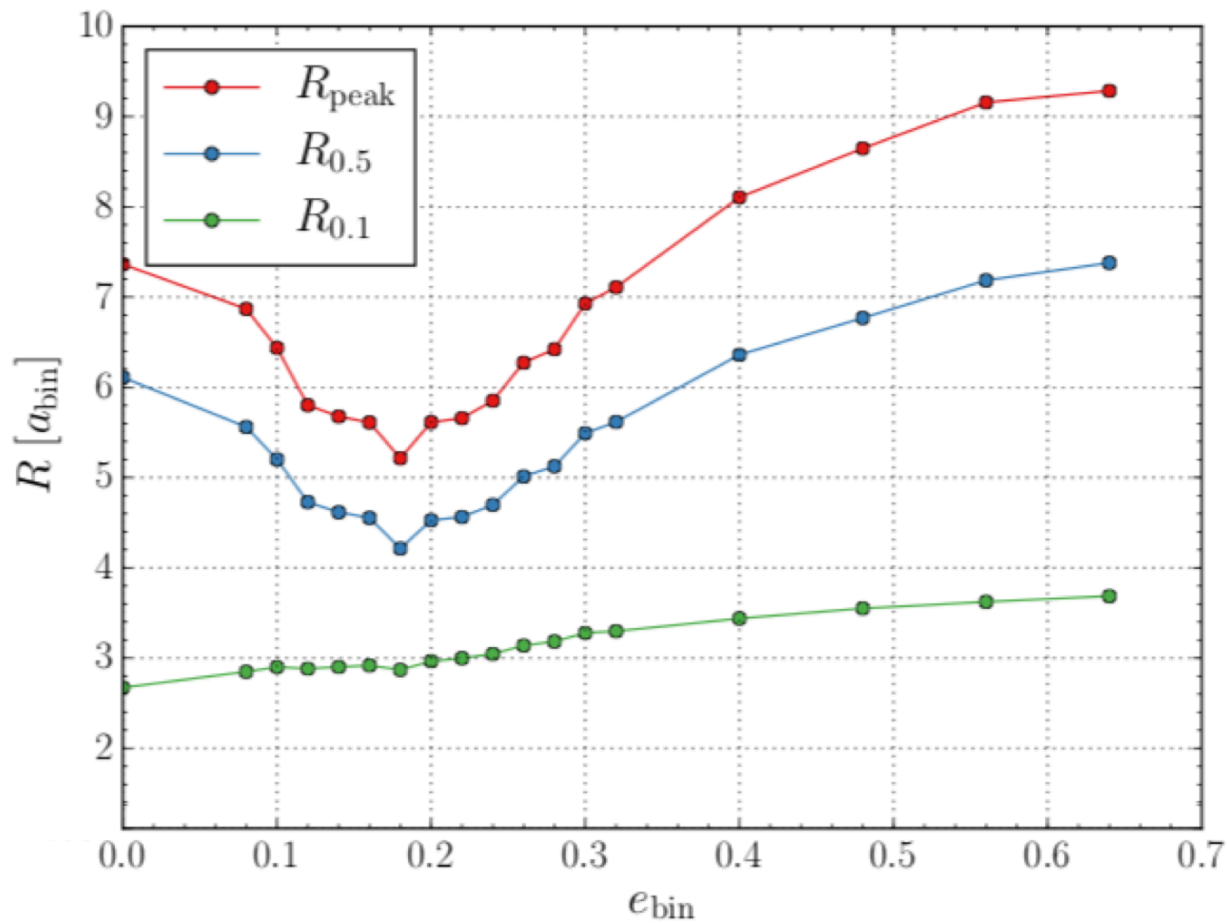
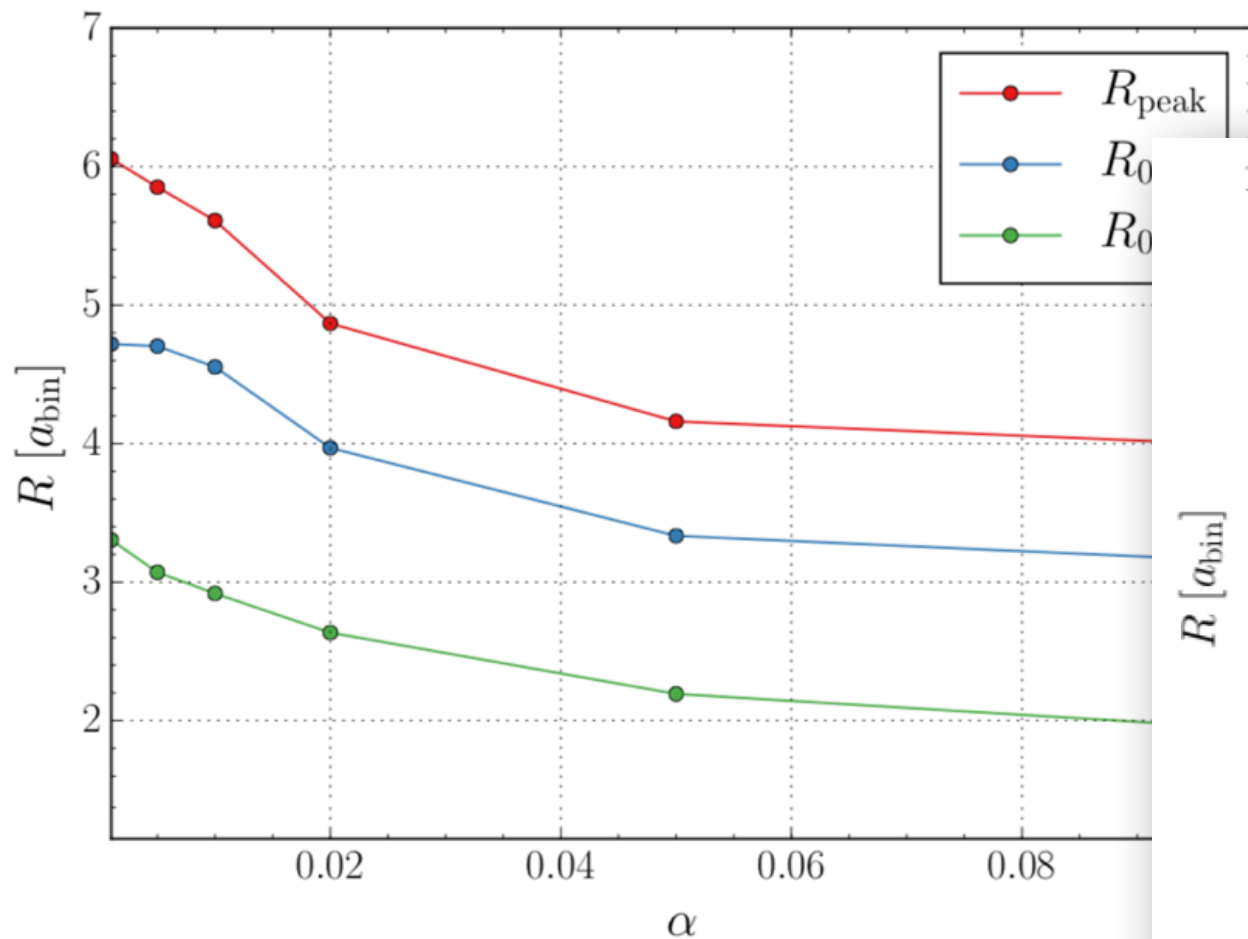
Inclination



But...

Circumbinary disks: Numerical and physical behaviour

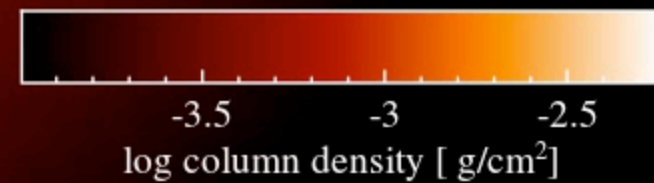
Giovanni Picogna²



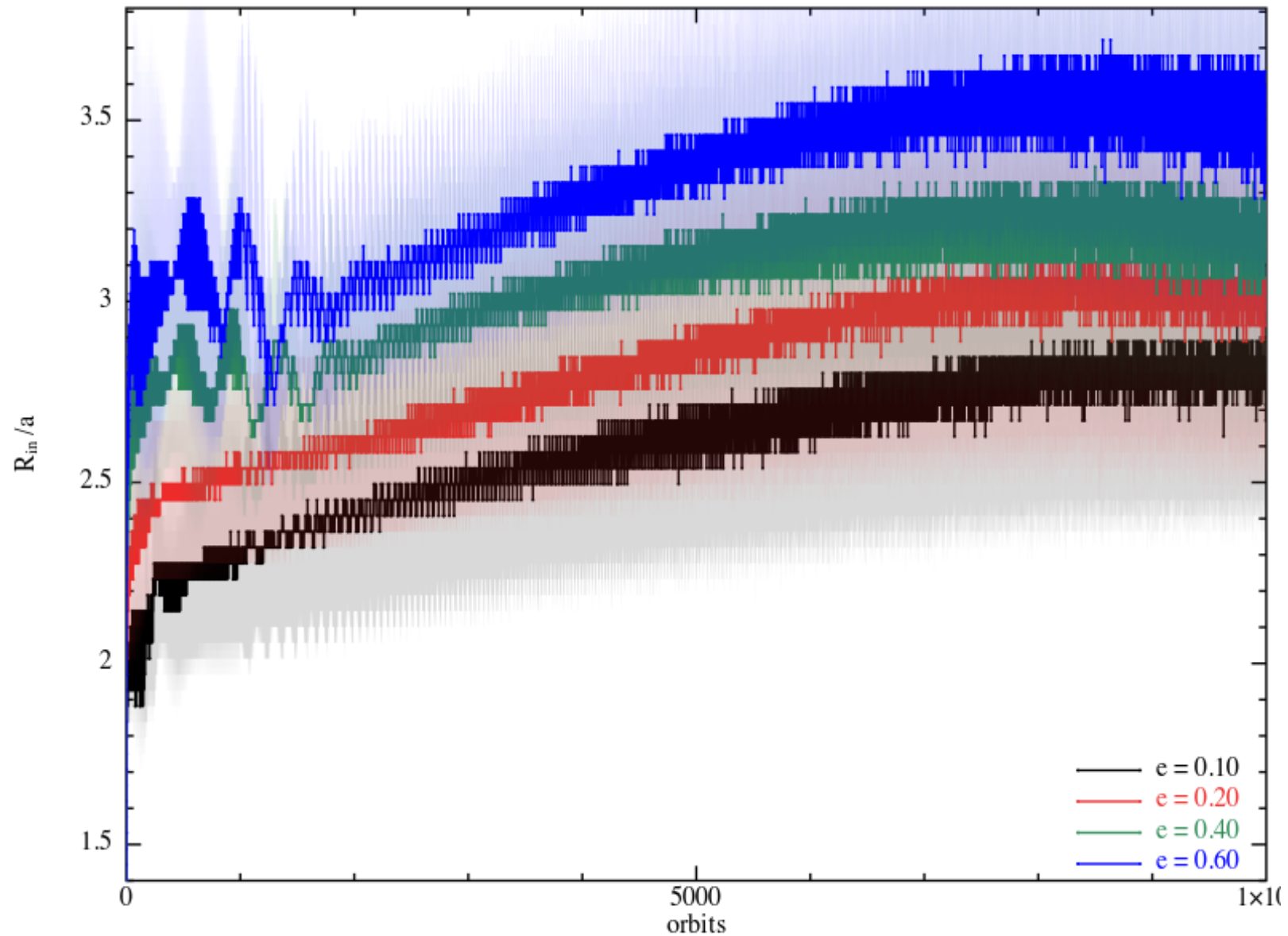
For varying binary eccentricities e_{bin} we find two separate branch around $e_{\text{crit}} \approx 0.18$ where the gap is smallest with the shortest T_{pr} . Circular binaries create the most eccentric disks.

Key words. Hydrodynamics – Methods: numerical – Planets and satellites: formation – Protoplanetary disks – Binaries: close

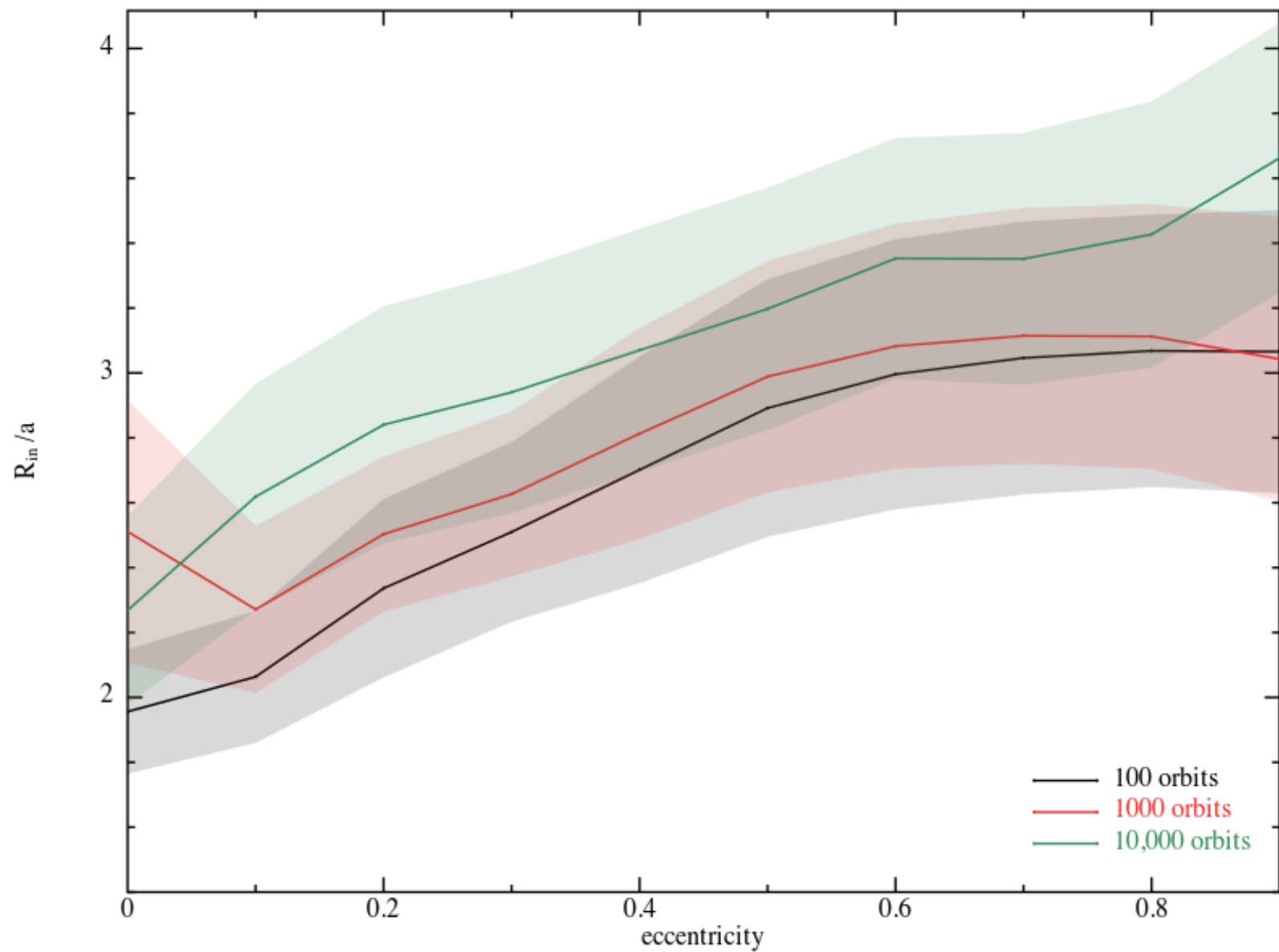
t=10000 orbits



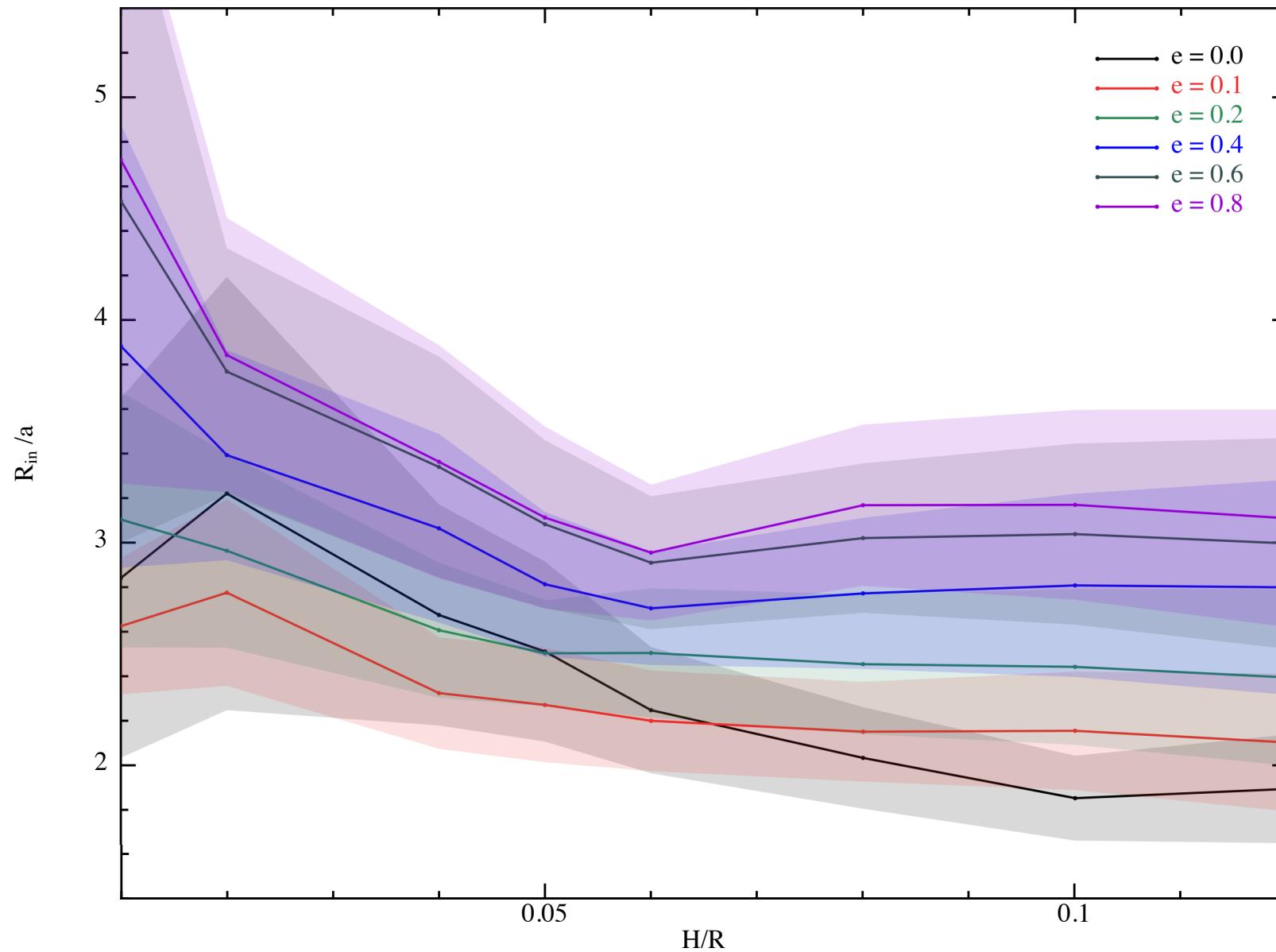
Time Evolution - ~~Known~~ ^{Known}

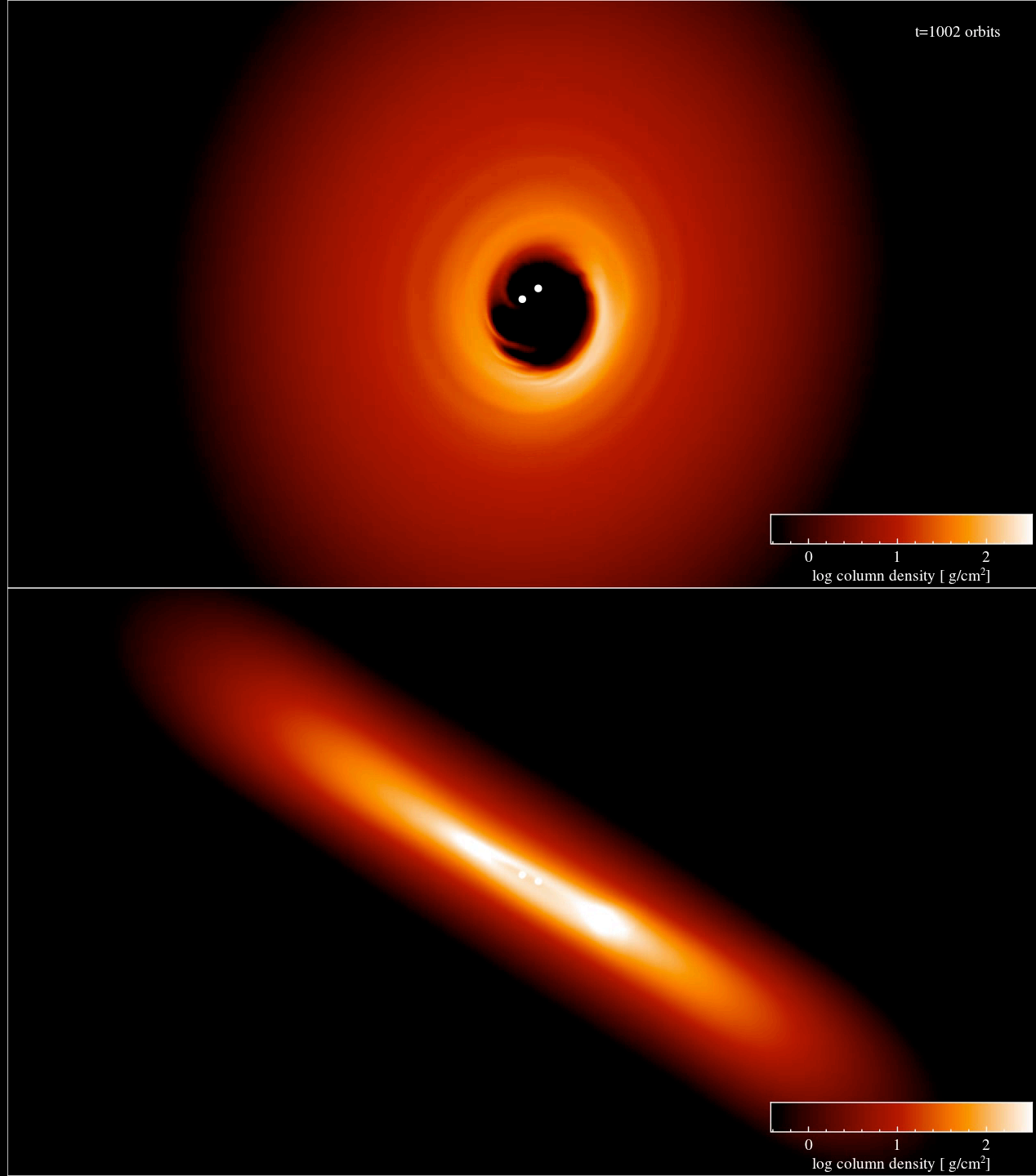


Eccentricity

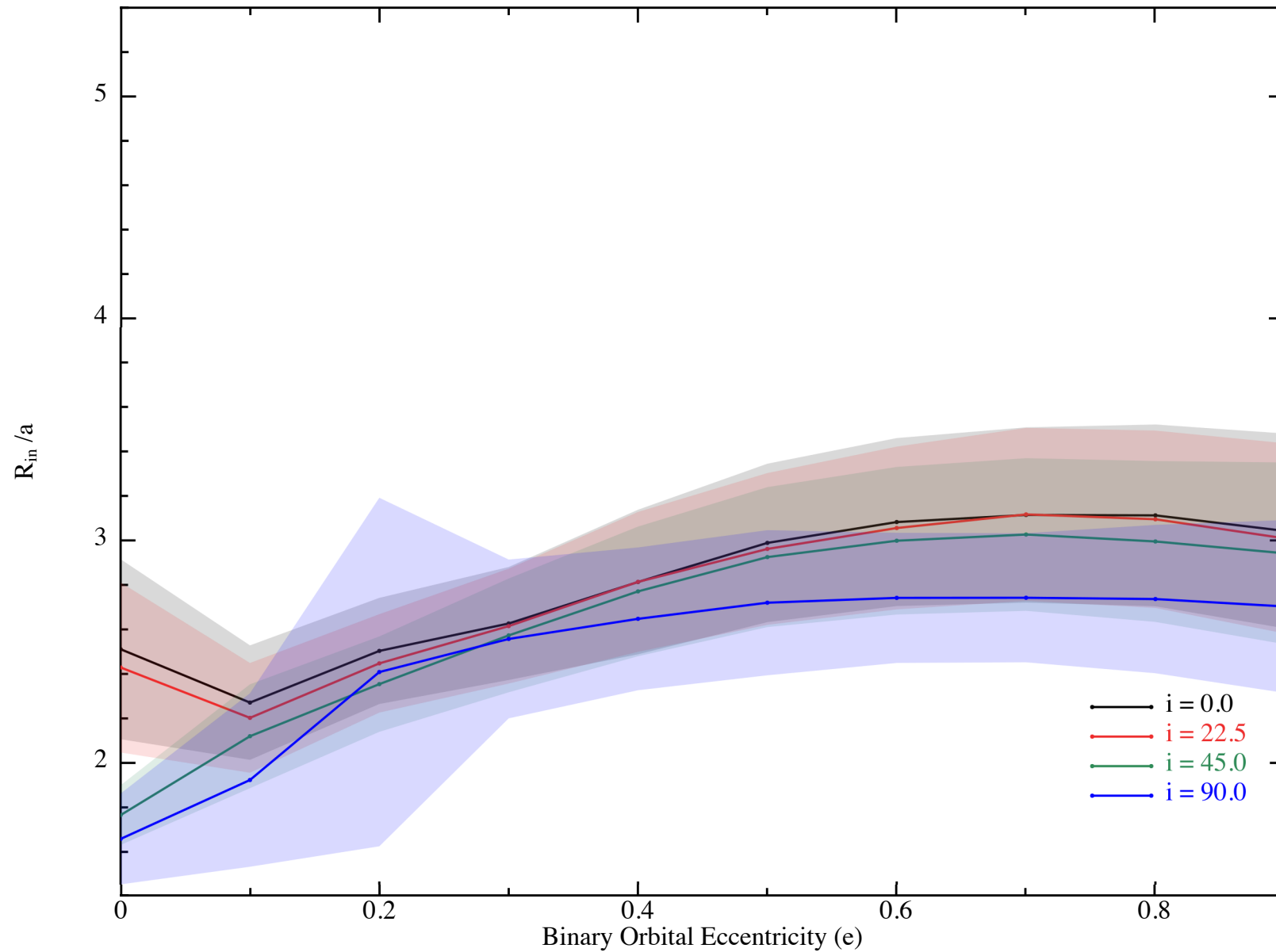


Scale Height

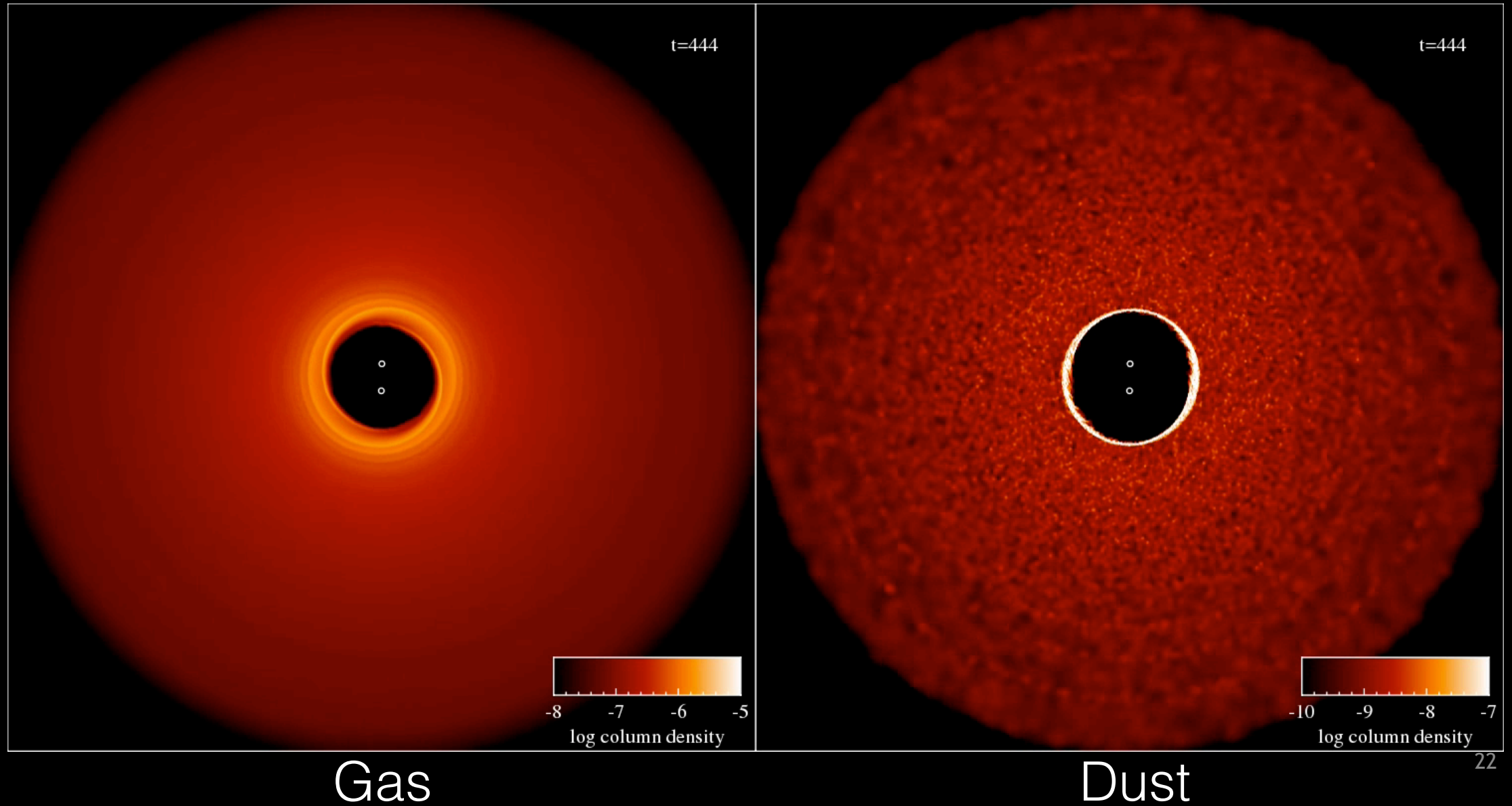




Inclination



Future Work



Take Home Messages

- There exists two timescales for cavity opening, dynamical and viscous.
- A cavity is quickly cleared within tens to hundreds of orbits.
- To see the effects of viscosity on cavity size requires resolving the viscous time.
- Discs with a low initial inclination will tend towards a coplanar orbit while a polar orbit is a stable configuration.