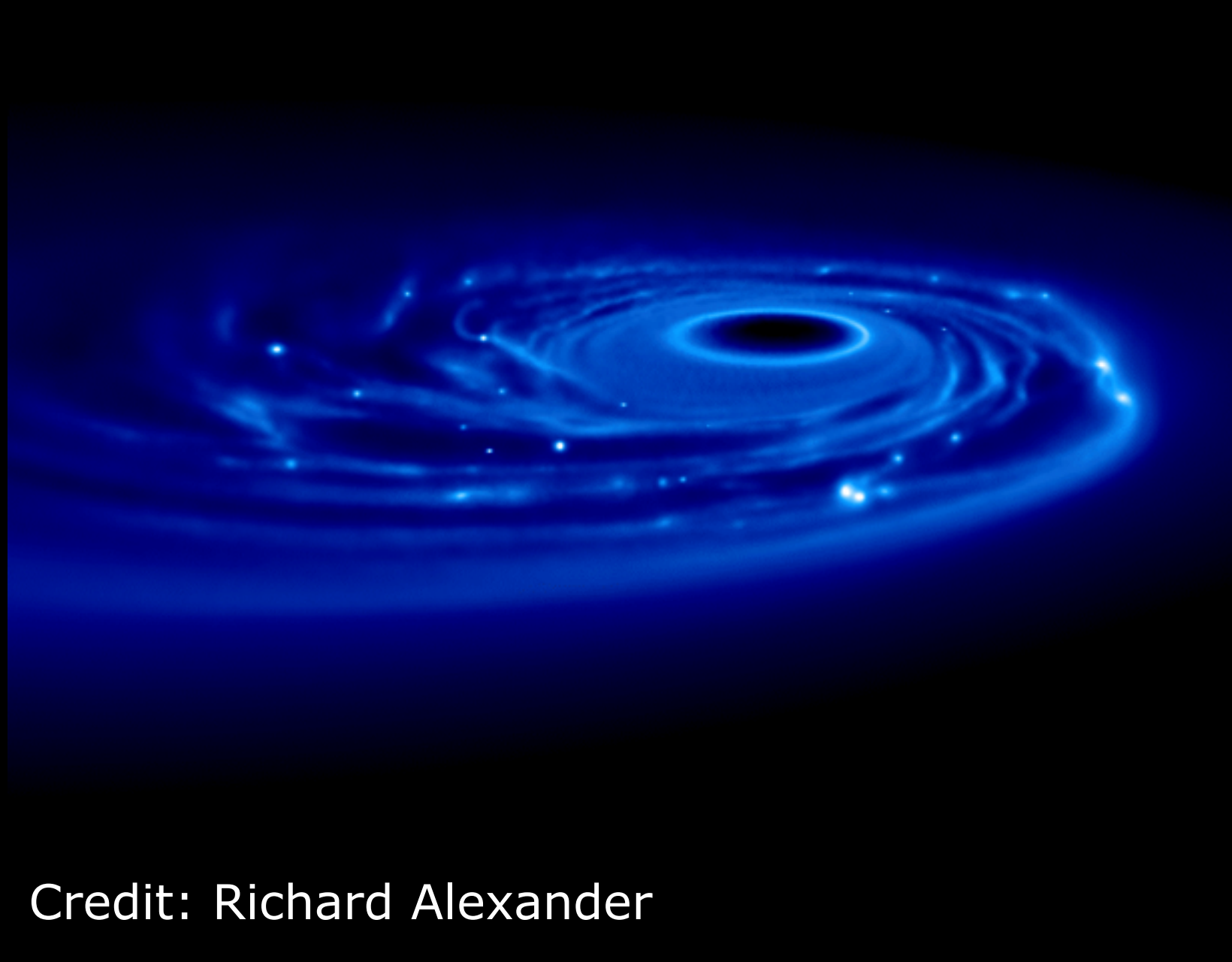


A new inclination instability in a disk of stars around a massive black hole

Ann-Marie Madigan, UC Berkeley



~50% of stars in nuclear star clusters form in-situ
(Antonini, 2015)



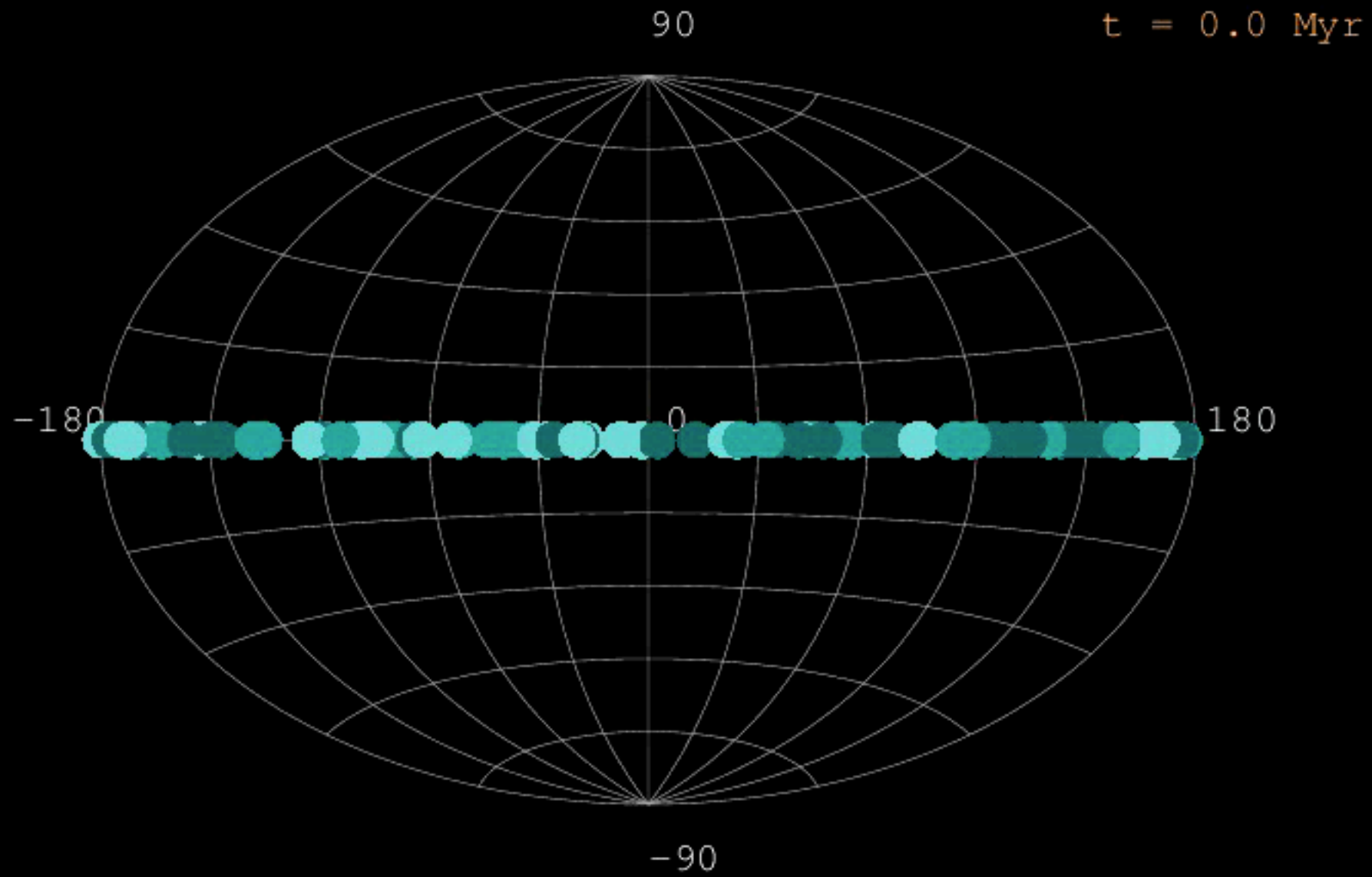
Credit: Richard Alexander

Disk stability

- Galactic center:
~80% of young stars not on disk plane
(Yelda et al. 2014) [Mapelli, 2015](#)
- Extra-galactic nuclear star clusters:
Rotation in young populations < 1 Gyr
(Seth et al. 2006)

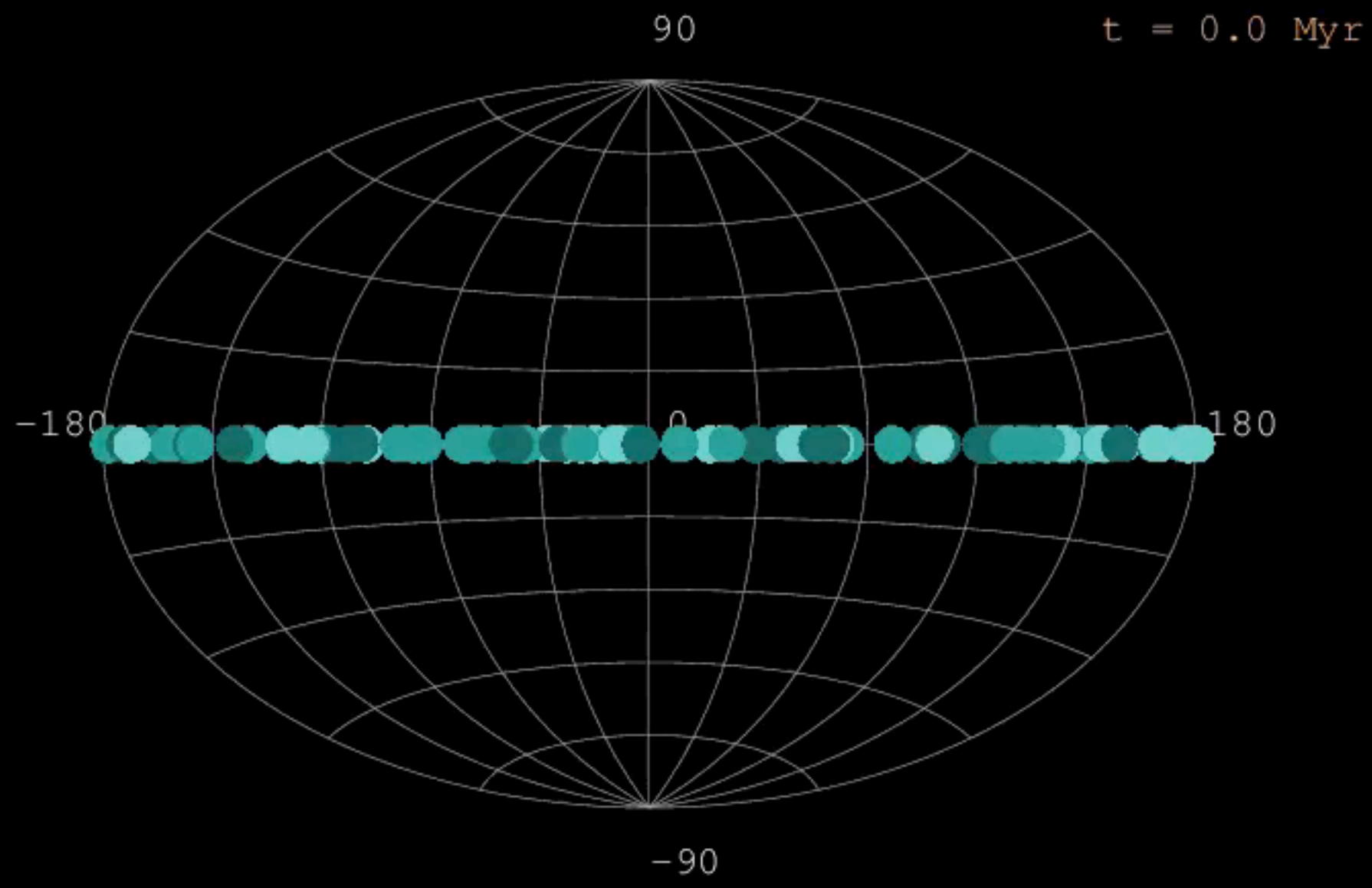
There is an instability in disks with eccentric orbits which rapidly disperses inclinations!

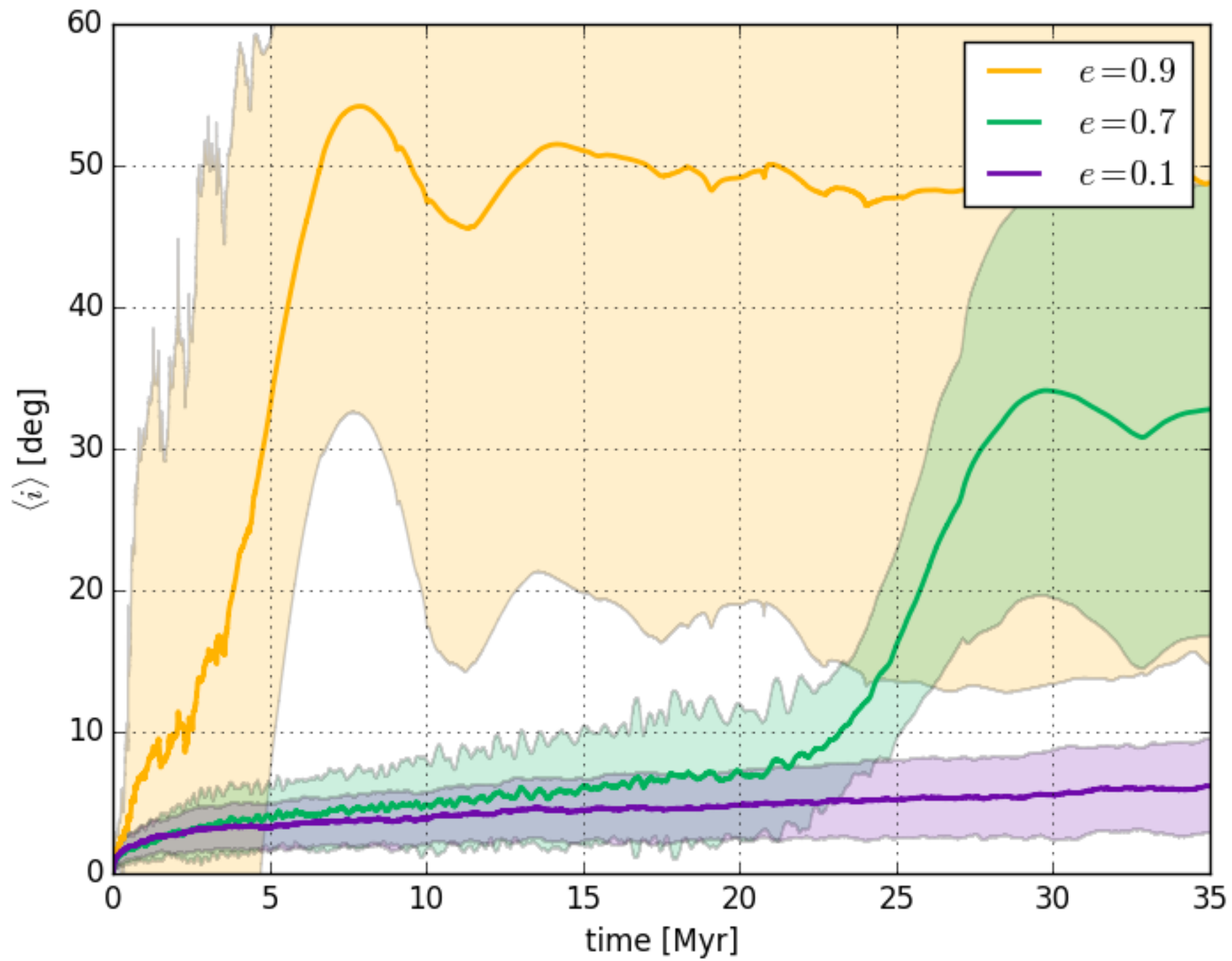
$e = 0.0$

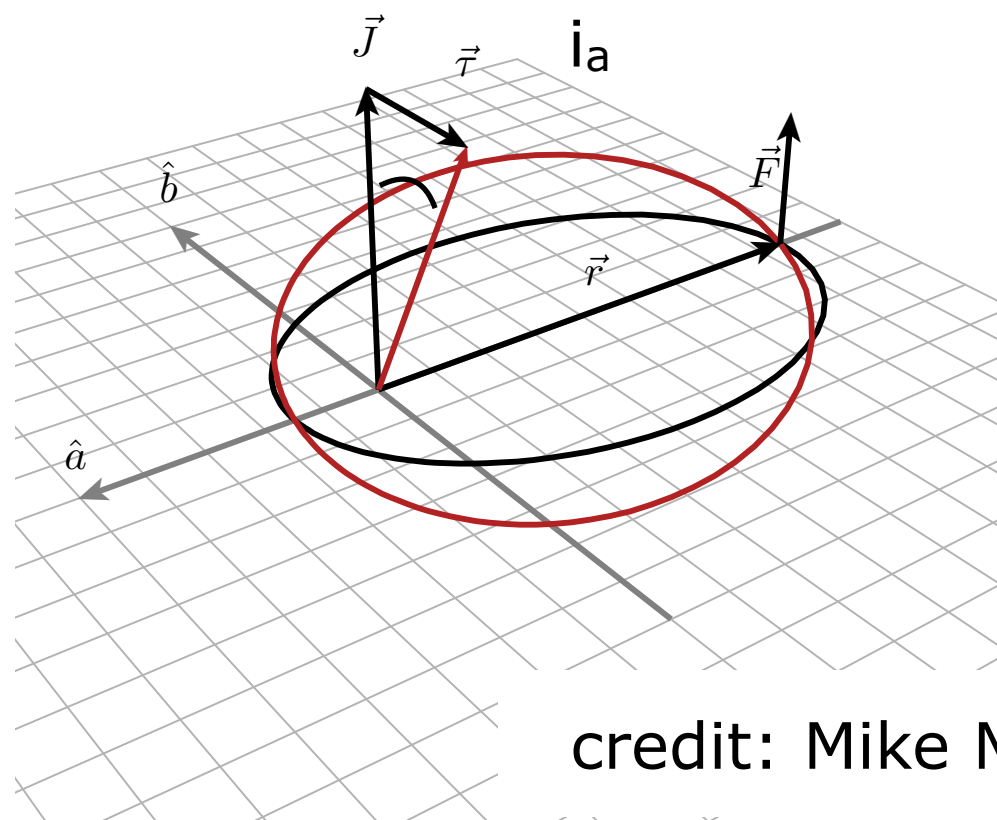
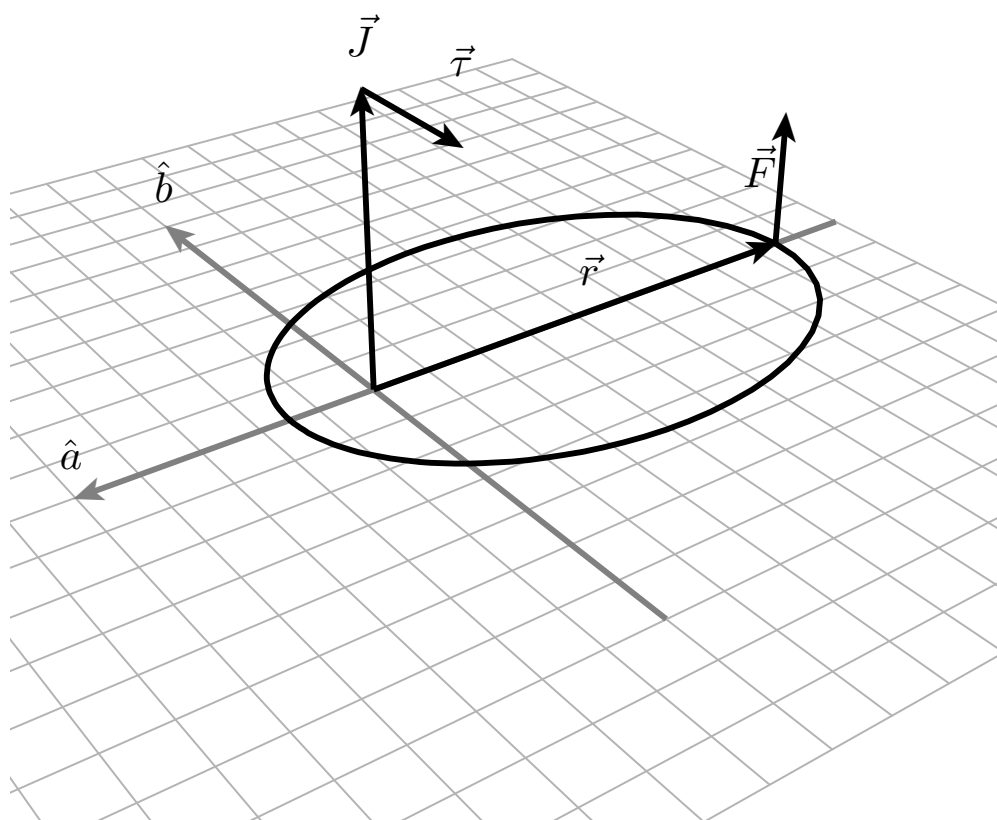
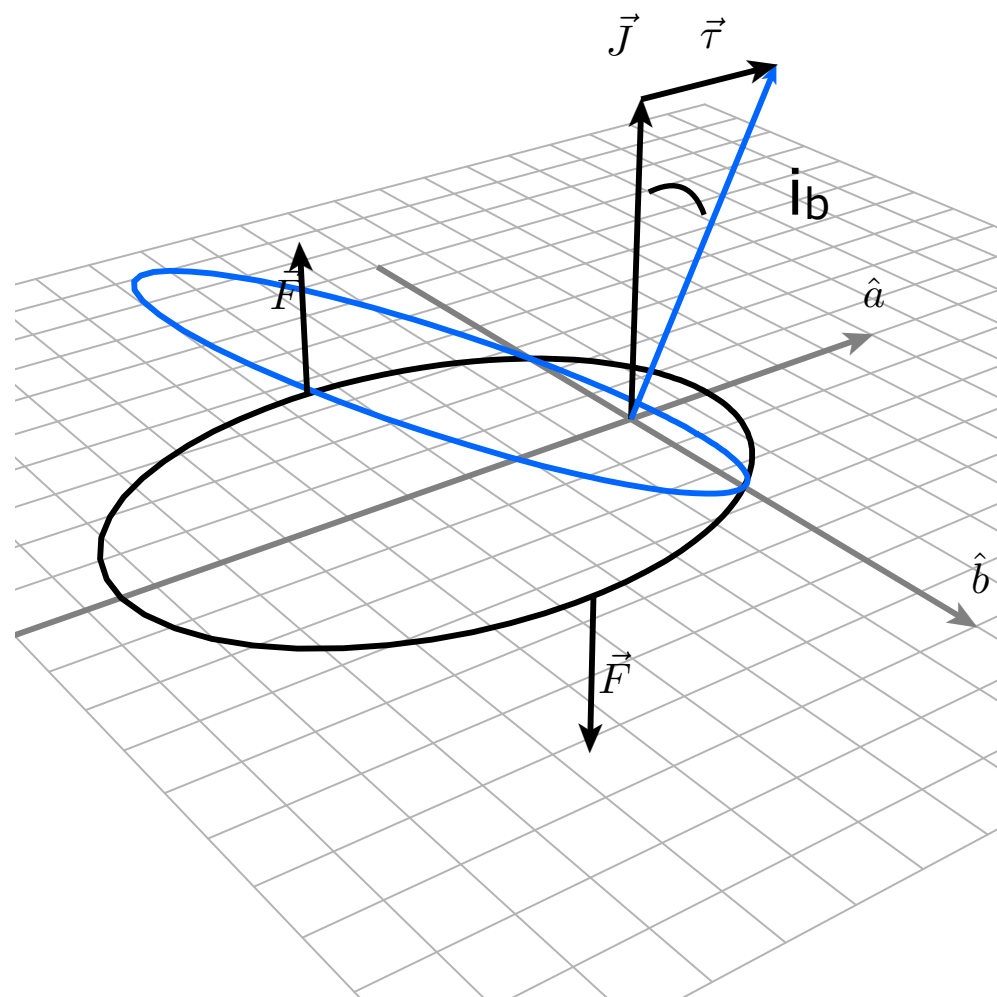
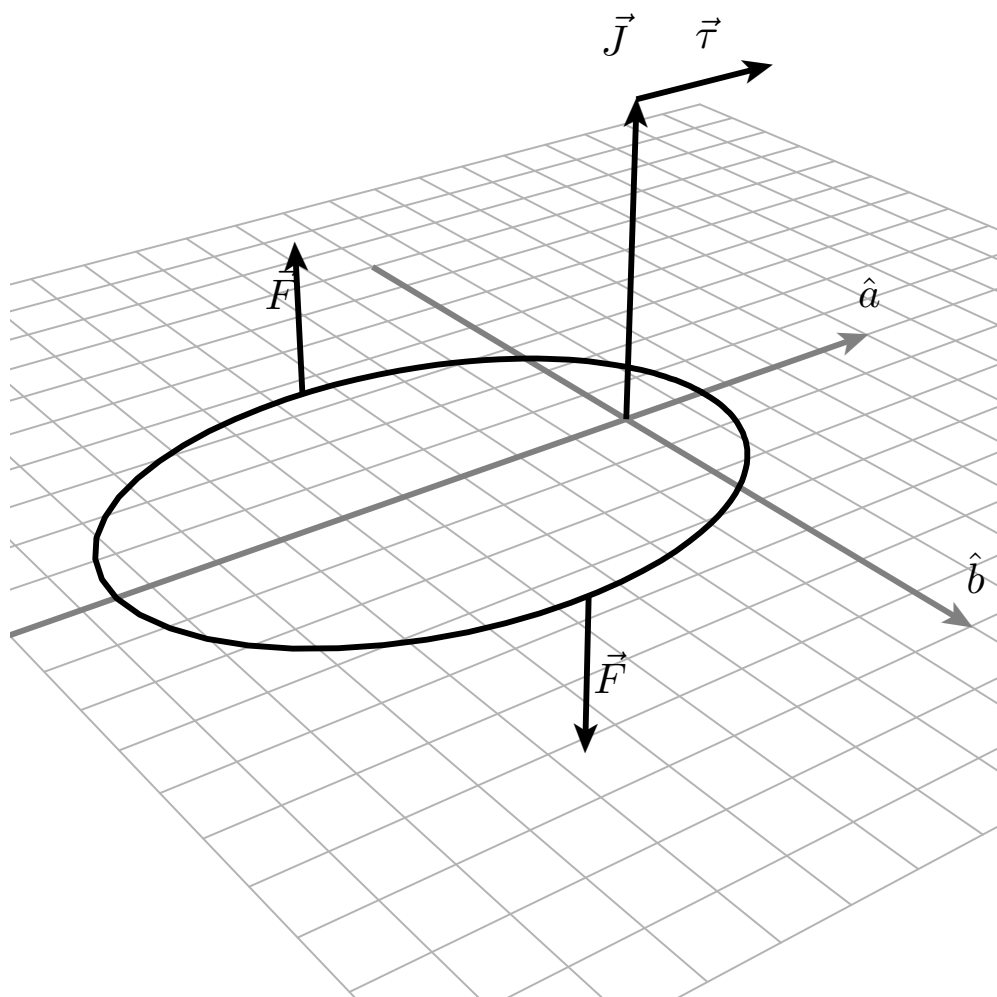


Disk of stars; parameters taken from Alexander et al. (2007)

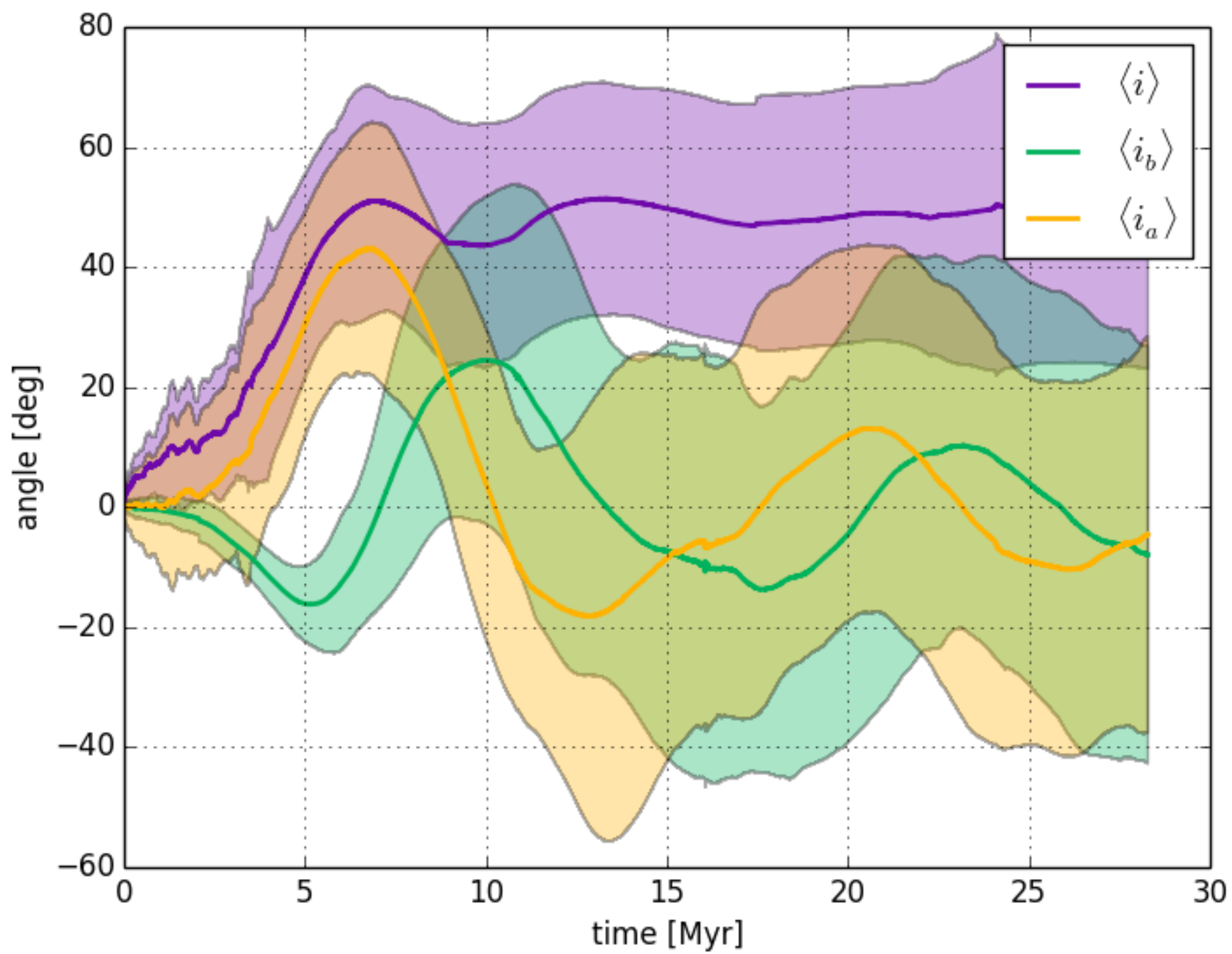
$e = 0.9$







credit: Mike McCourt



Summary

An inclination instability exists in Kepler disks of eccentric orbits.

1. Constraints on gas accretion event which formed young disk in Galactic center.
2. Inner Oort Cloud objects are clustered in ω (Trujillo & Sheppard 2014)

Clustering in ω

