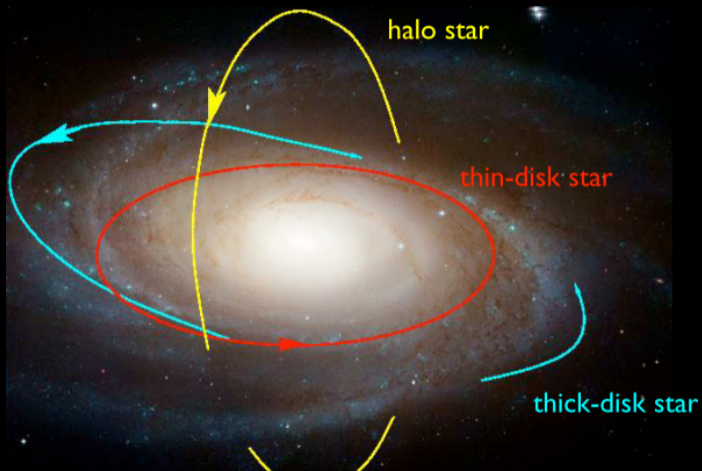


Mechanism(s) producing thick disks

The stellar components are old ($\gtrsim 10 - 12$ Gyr), metal-poor, and are enhanced in α -elements compared to thin-disk stars with similar metallicities.

The possible formation scenarios depend on the birth place of the constituent stars.

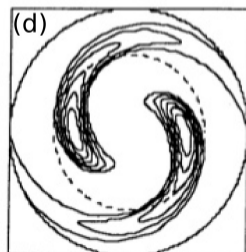
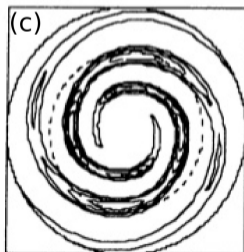
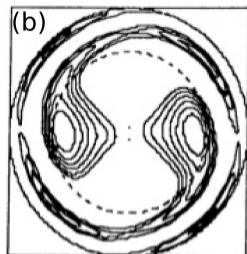
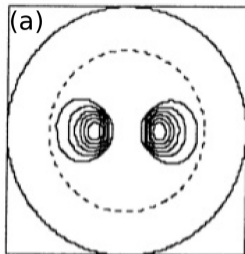
- ▶ Thin disk
- ▶ Thick disk (in situ)
- ▶ Externally



Disk instabilities

Global instabilities can cause a significant transformation of the overall disk structure.

Local instabilities determine if perturbations smaller than the disk size can grow.



Density contours of global instability nodes for a rotating disk (Dobbs & Baba, 2014)