



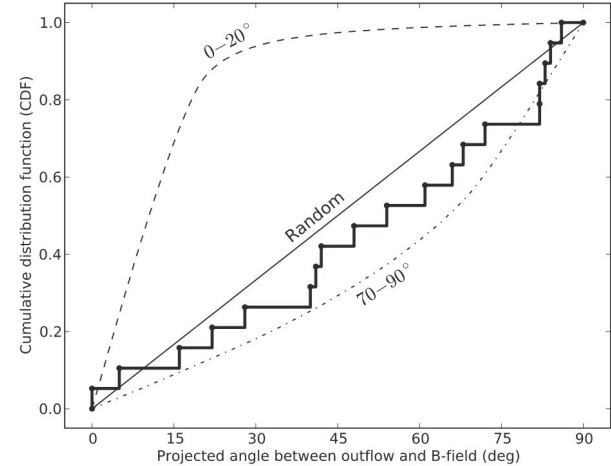
# Observational Signatures of Misaligned Magnetic Fields in Early Disk Formation

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# Exploring Misaligned Collapse

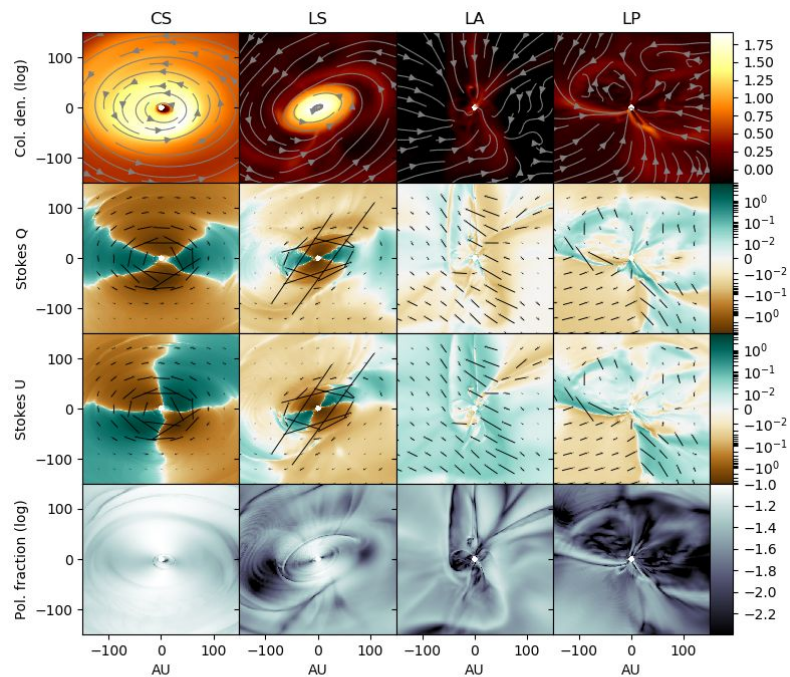
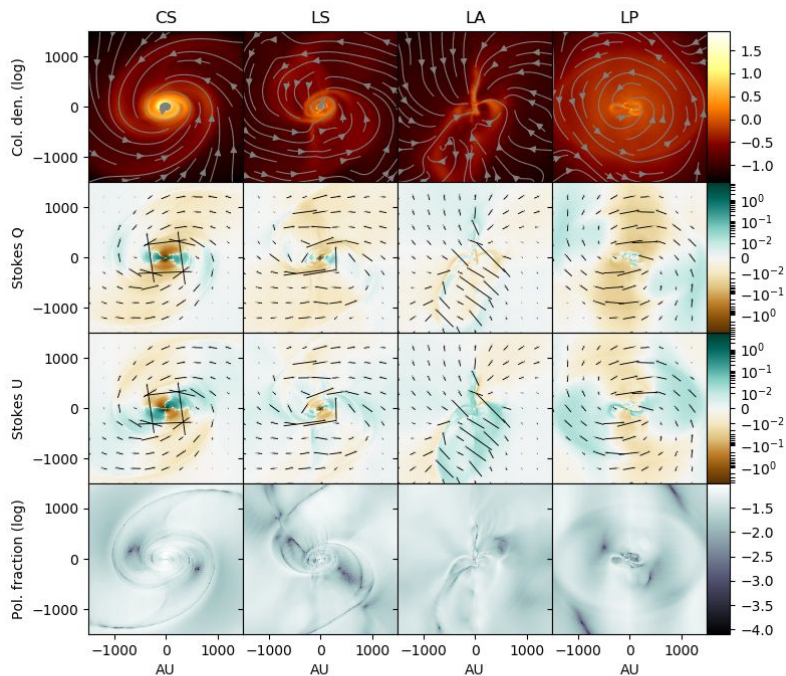
- Misalignment of rotation axis and the magnetic field is one of the suggested solutions of magnetic braking catastrophe.
- Li, Krashnopol'sky & Shang (2014) performed the MHD simulations.
- We use **Perspective** code to model simple radiative transfer and magnetically aligned polarization, in style of Fiege & Pudritz (2000).
- What can we learn?
- Can these things be observed in systems?



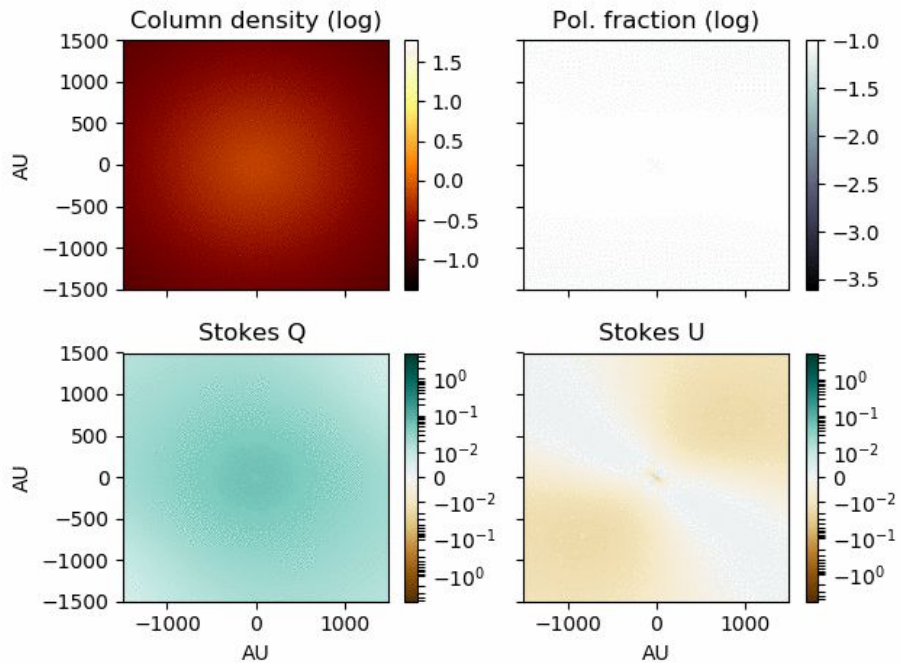
Hull et al. (2013), ApJ, 768,159

**Animations!**

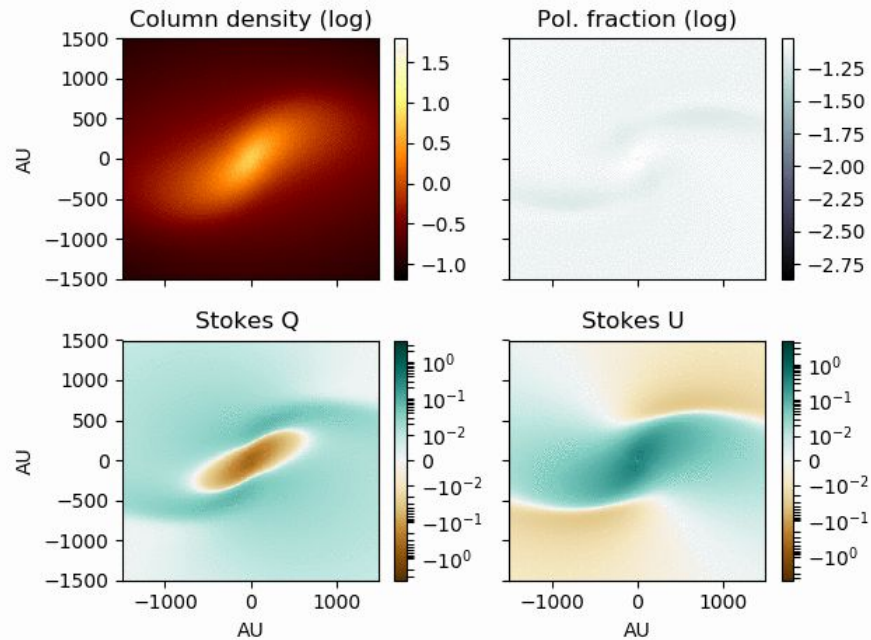
# Observed Types from Simulation Data



# Spirals in Motion

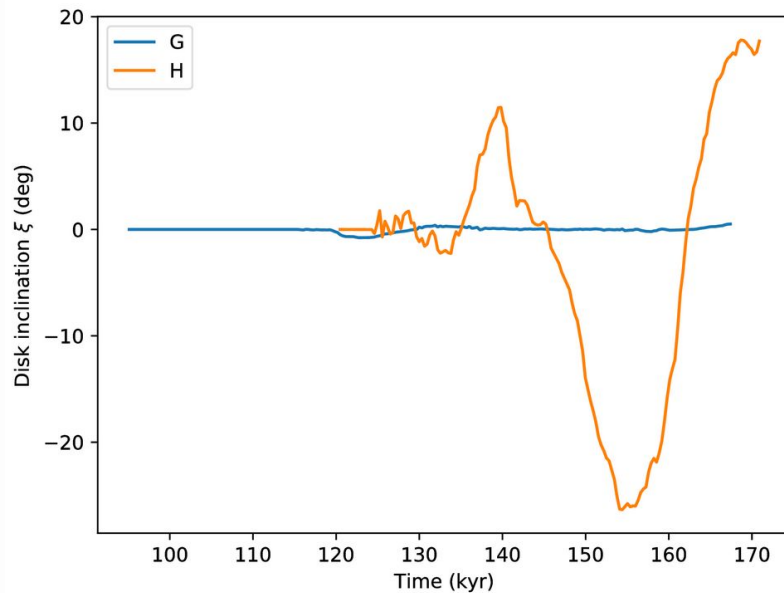
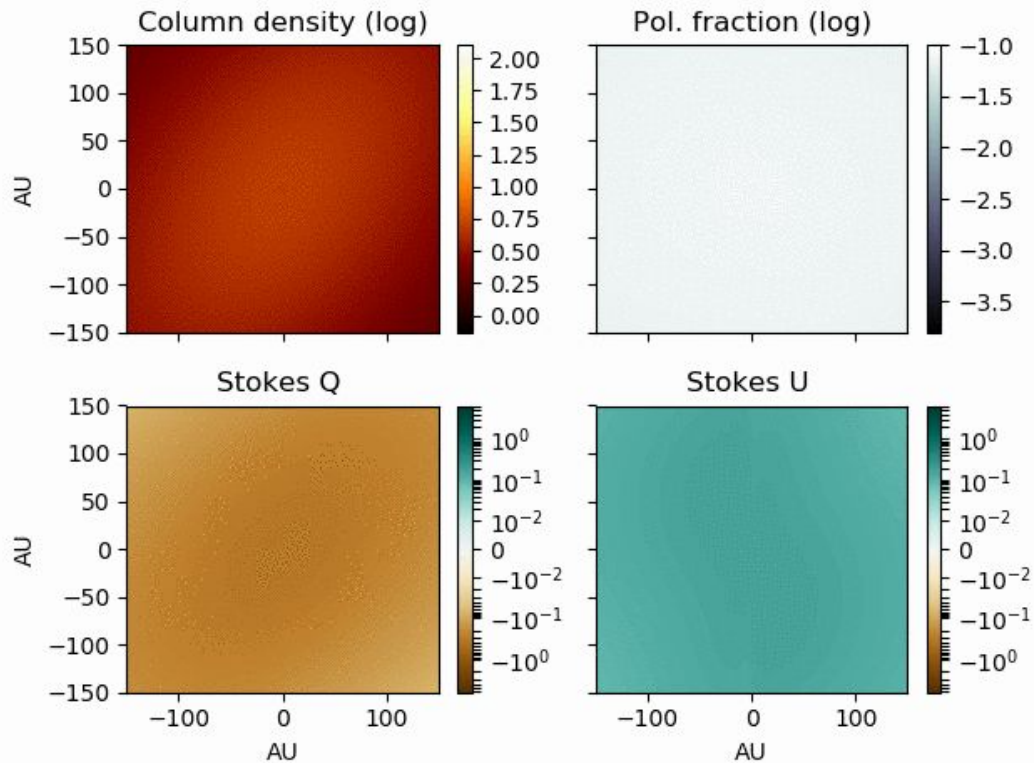


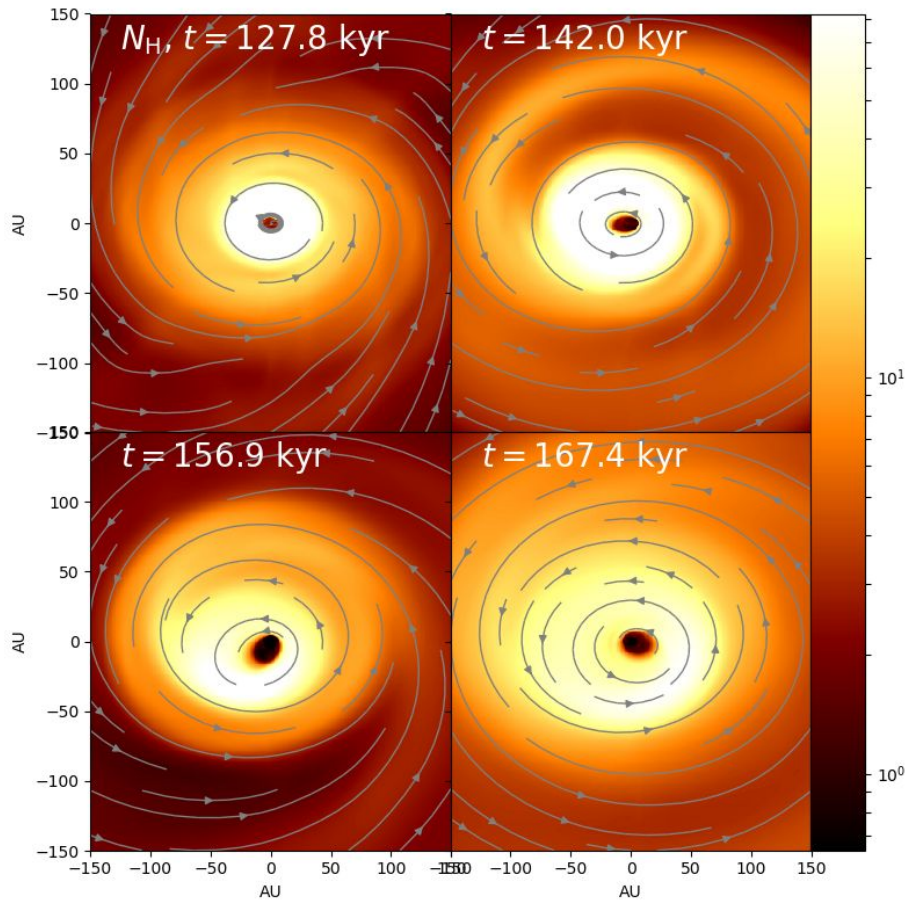
Clear spiral



Leaking spiral

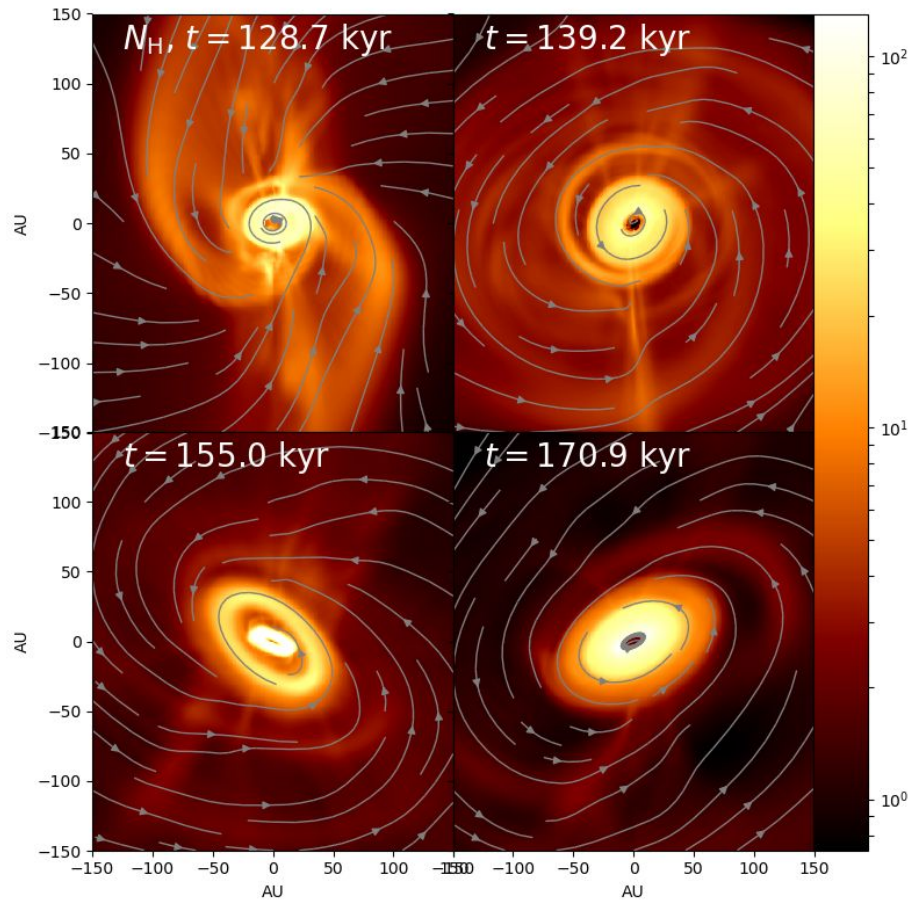
# Precession



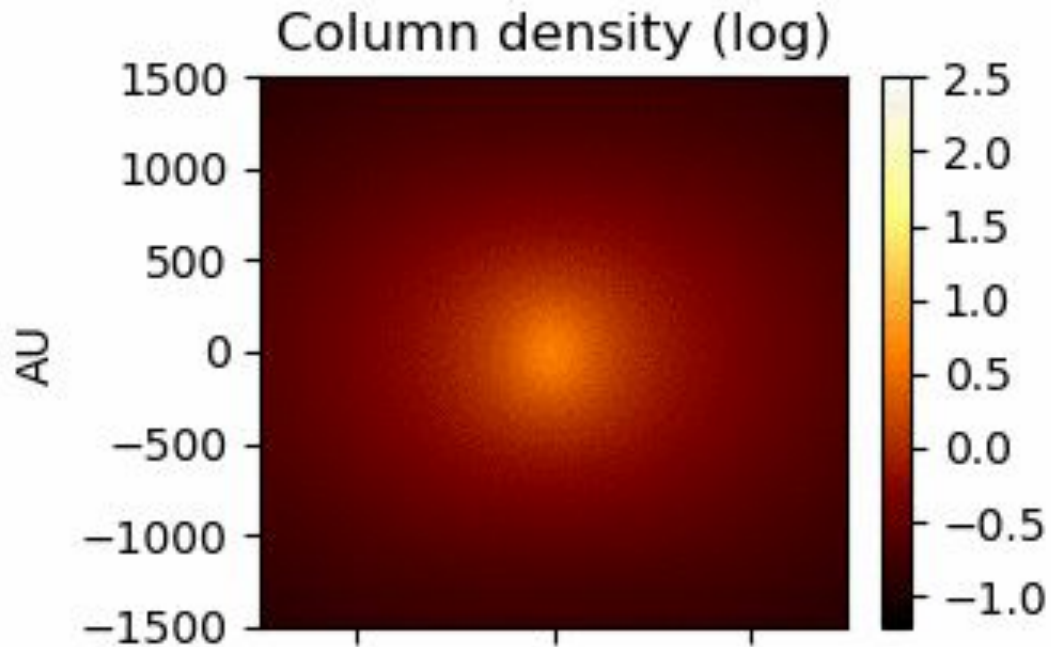


Clear spiral

# Disk Comparison



Leaking spiral



## Infunnels

Inflows can produce cone-like effects that can be easily mistaken for an outflow cavity.

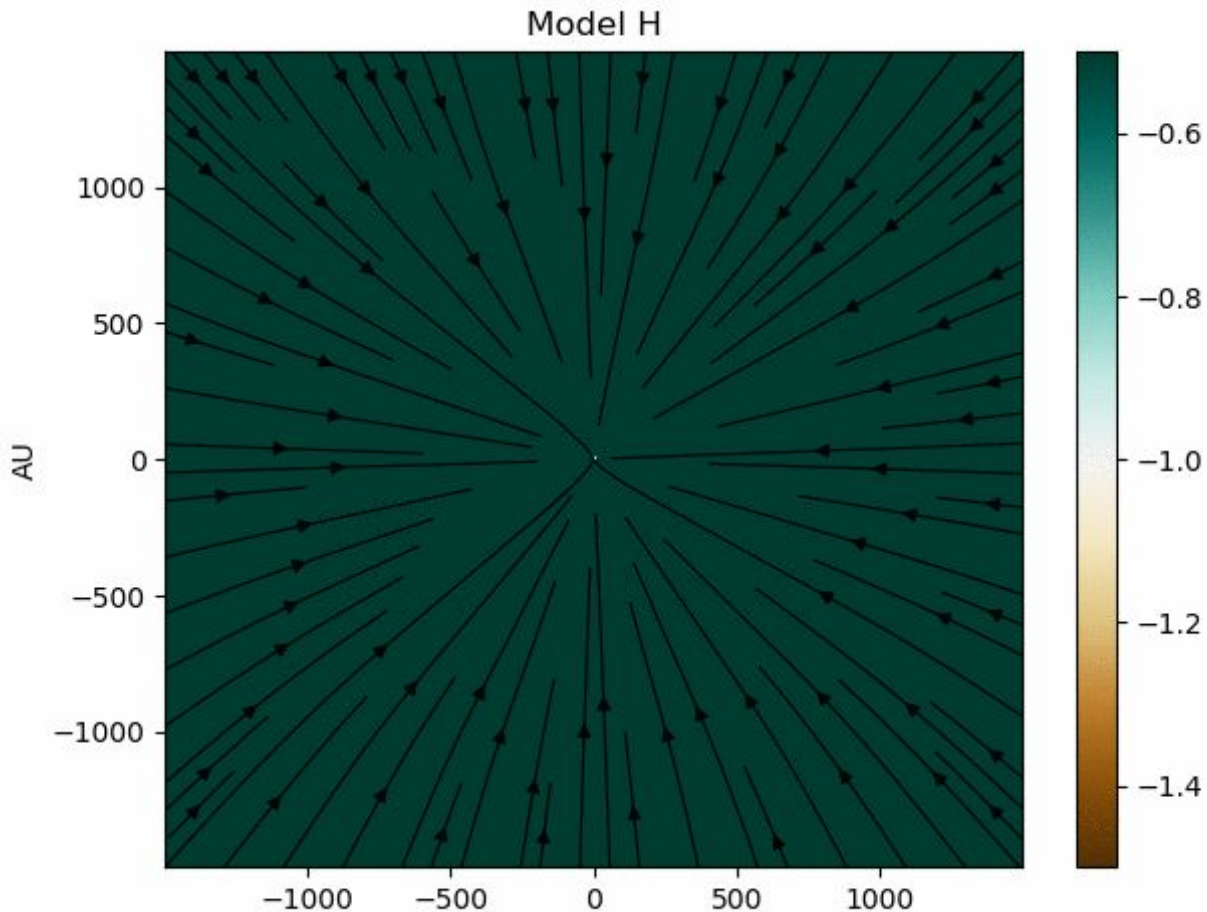
Behaviour the inflow is funnel-like, so we coined the term '**infunnel**', to avoid confusion.

# Outflows

Blue: inward motion  
Brown: outward motion

Sudden and bullet-like.

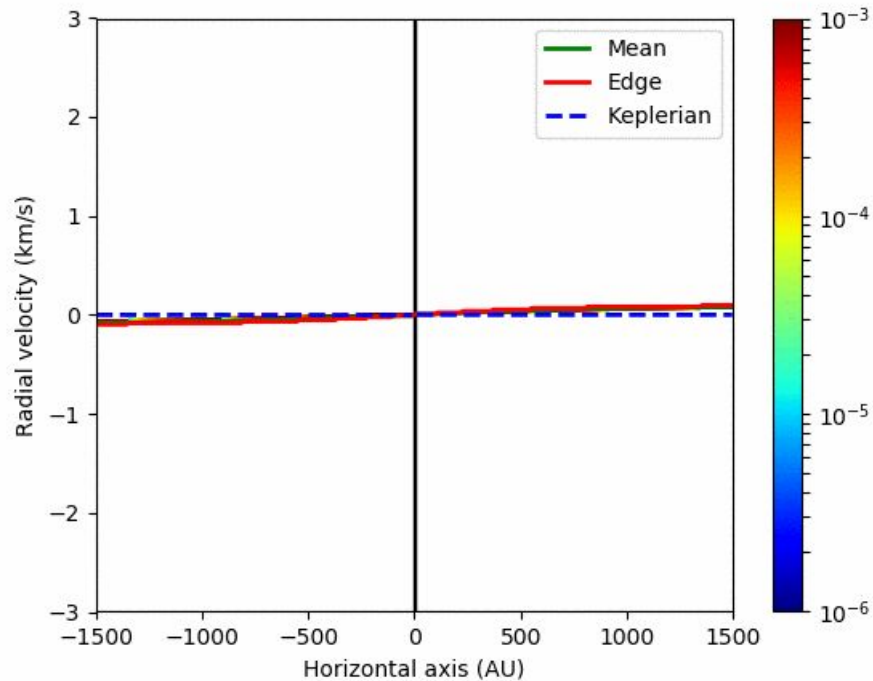
Now obvious signs of continuous outflow.



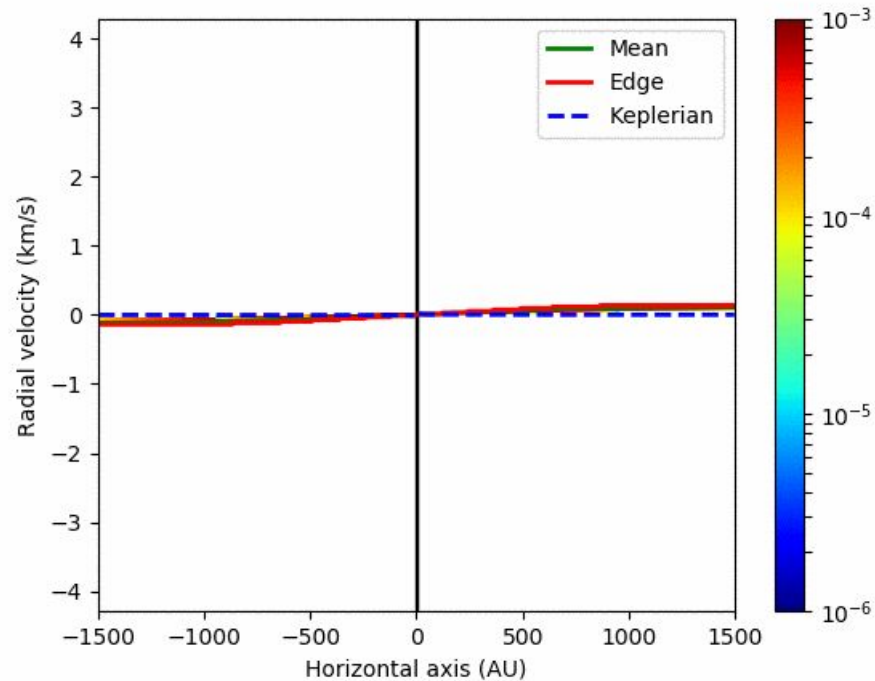


# Position Velocity Diagrams

Clear Spiral

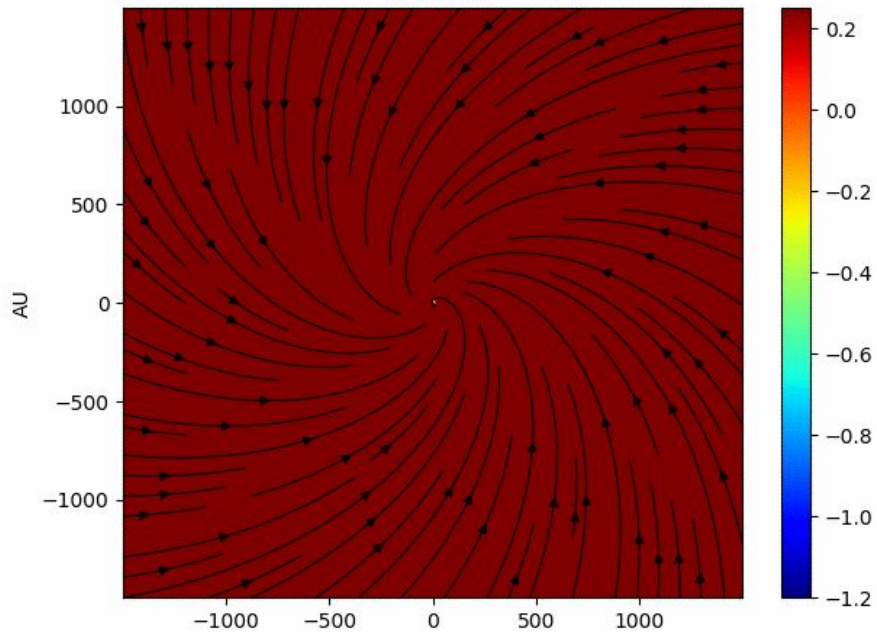


Leaking Spiral



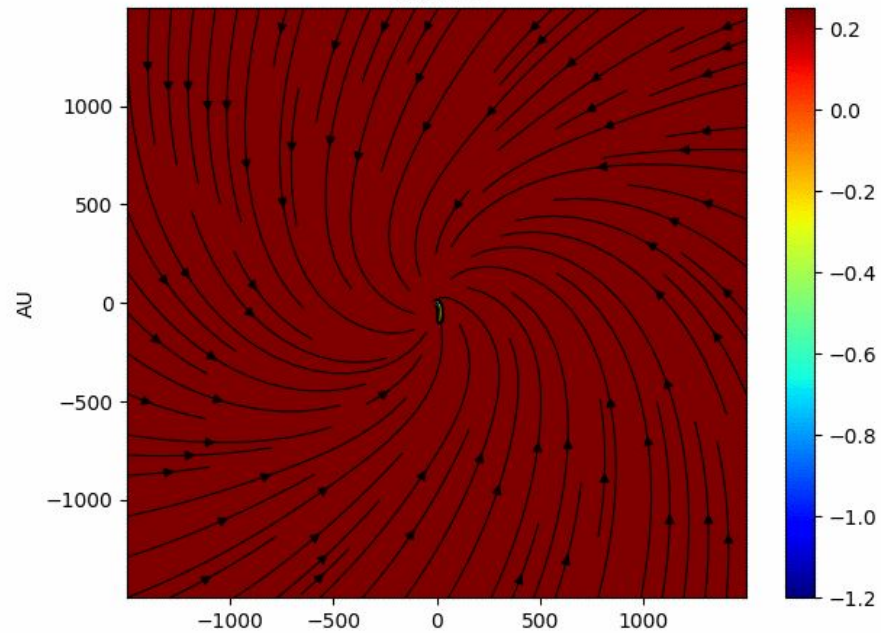
# Velocity Perturbations

Model G



Clear Spiral

Model H



Leaking Spiral

# Take-home messages

Pseudo-Disks are present!

Do not mix infunnels with an outflows.

Magnetic field can induce disk precession.

Velocities deviate from circular Keplerian velocity.

감사합니다!