

The reflex instability

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Identified in [Crida et al. \(2025b\)](#), the reflex instability is caused by the motion of the star around the center of mass of the star-disk system. It leads to the exponential growth of an $m=1$ mode in the density distribution.

We ran numerical simulations using FARGOCA, and explored how the reflex instability depends on various parameters. To break the axisymmetry, a small mass planet is held on a fixed orbit at $r=1 r_0$ (code unit).

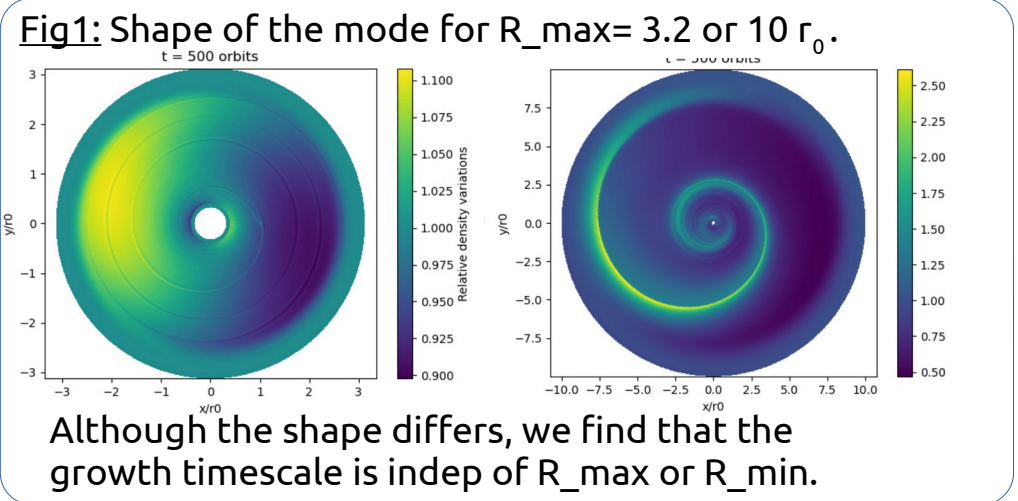
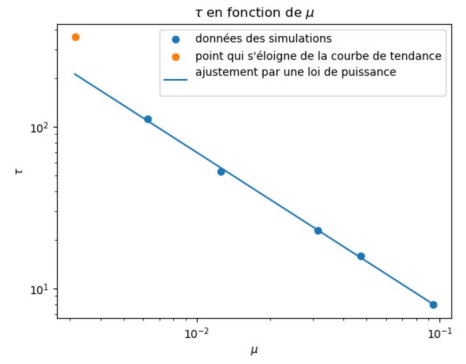
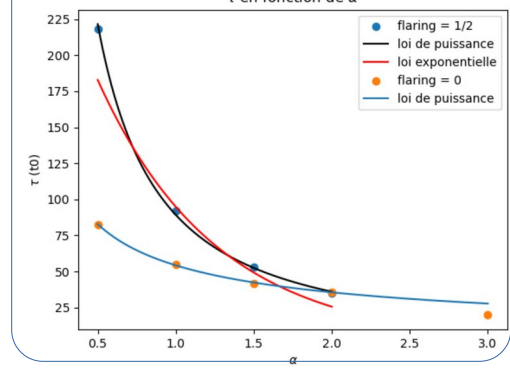


Fig2: As expected, the growth timescale τ is inversely proportional to the disk surface density.



For $\mu = \pi \Sigma r_0^2 / M_* < 0.005$, departure from the trend. Is a damping effect becoming non-negligible ?

Fig3: Complex dependance of τ as a function of the slope of the surface density profile α and the flaring index β of the aspect ratio h . NB: We also found a non-monotonic dependance of τ as a function of h .



This preliminary exploratory work argues for a more exhaustive and detailed study of the reflex instability. Stay tuned (and/or contribute) !