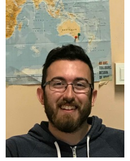


Any questions?
I am probably nearby

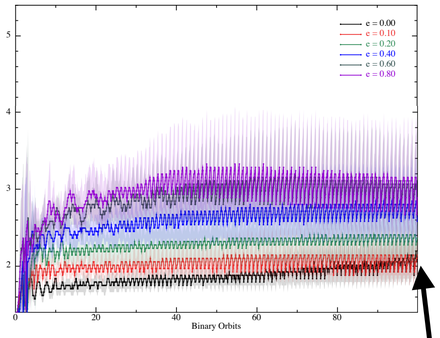
What sets the cavity size in circumbinary discs?

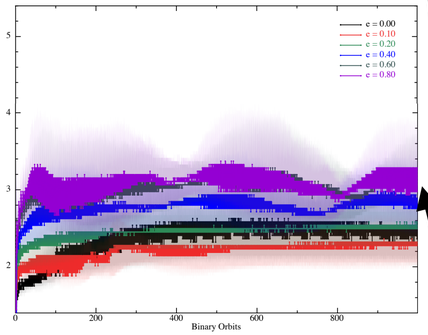
Kieran Hirsh
Daniel Price
Jean-François Gonzalez

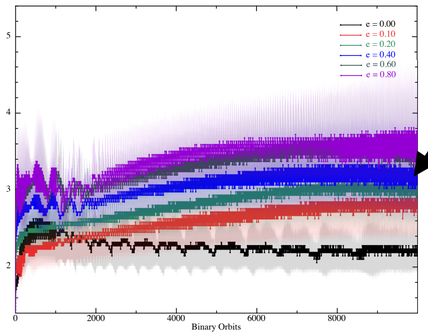
Centre de Recherche Astrophysique de Lyon
kieran.hirsh@univ-lyon1.fr

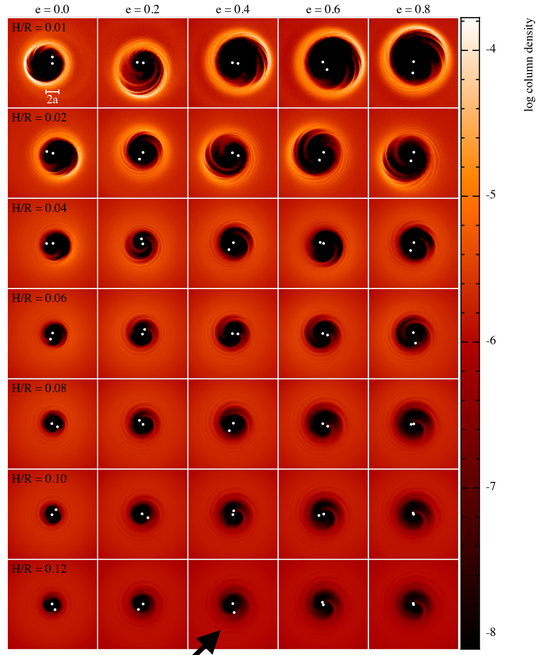
We run PHANTOM (Price et al. 2018) with 1,000,000 SPH particles.

Viscosity?









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Cavities form on the viscous time. (c.f. Thun et al. 2017)

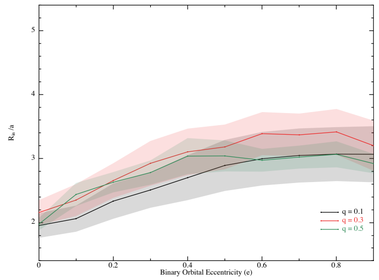
We assume an α disc (Shakura & Sunyaev 1973):

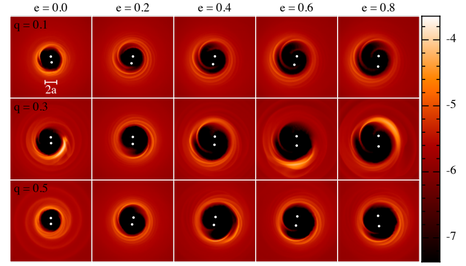
- $\nu = \alpha c_s H$

References

Shakura N. I., Sunyaev R. A., 1973, A&A, 24, 337
Artymowicz P., Lubow S. H., 1994, ApJ, 421, 651
Miranda R., Lai D., 2015, MNRAS, 452, 2396
Thun D., Kley W., Picogna G., 2017, A&A, 604, A102
Price D. J., et al., 2018a, Publ. Astron. Soc. Australia, 35, e031

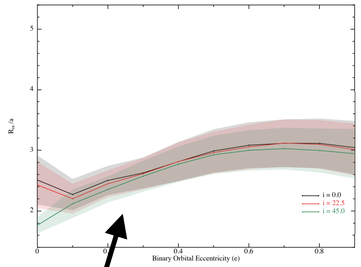
Binary Mass Ratio?





Largest cavities (3-4 times binary semi-major axis), and prominent horseshoes, are seen around intermediate mass companions on eccentric orbits.

Disc Inclination?



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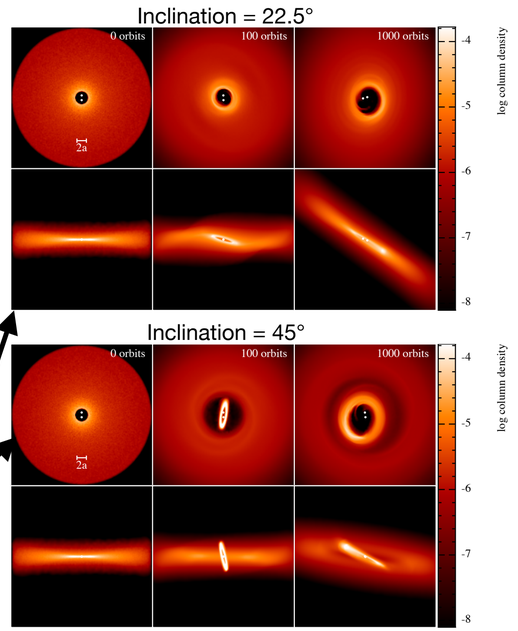
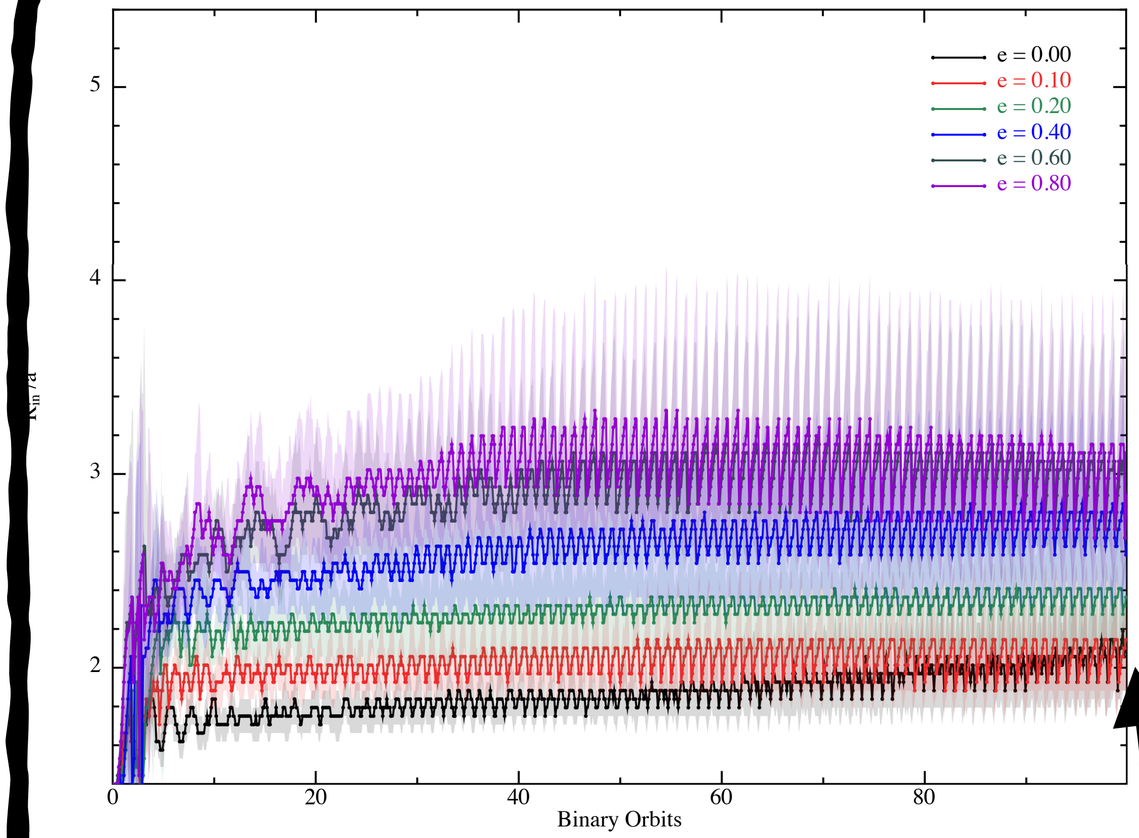
Disc with low initial inclination warp or break, tending towards a coplanar orbit.



Viscosity?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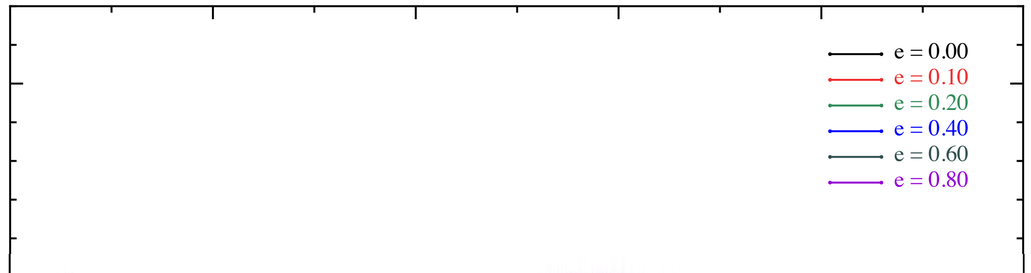
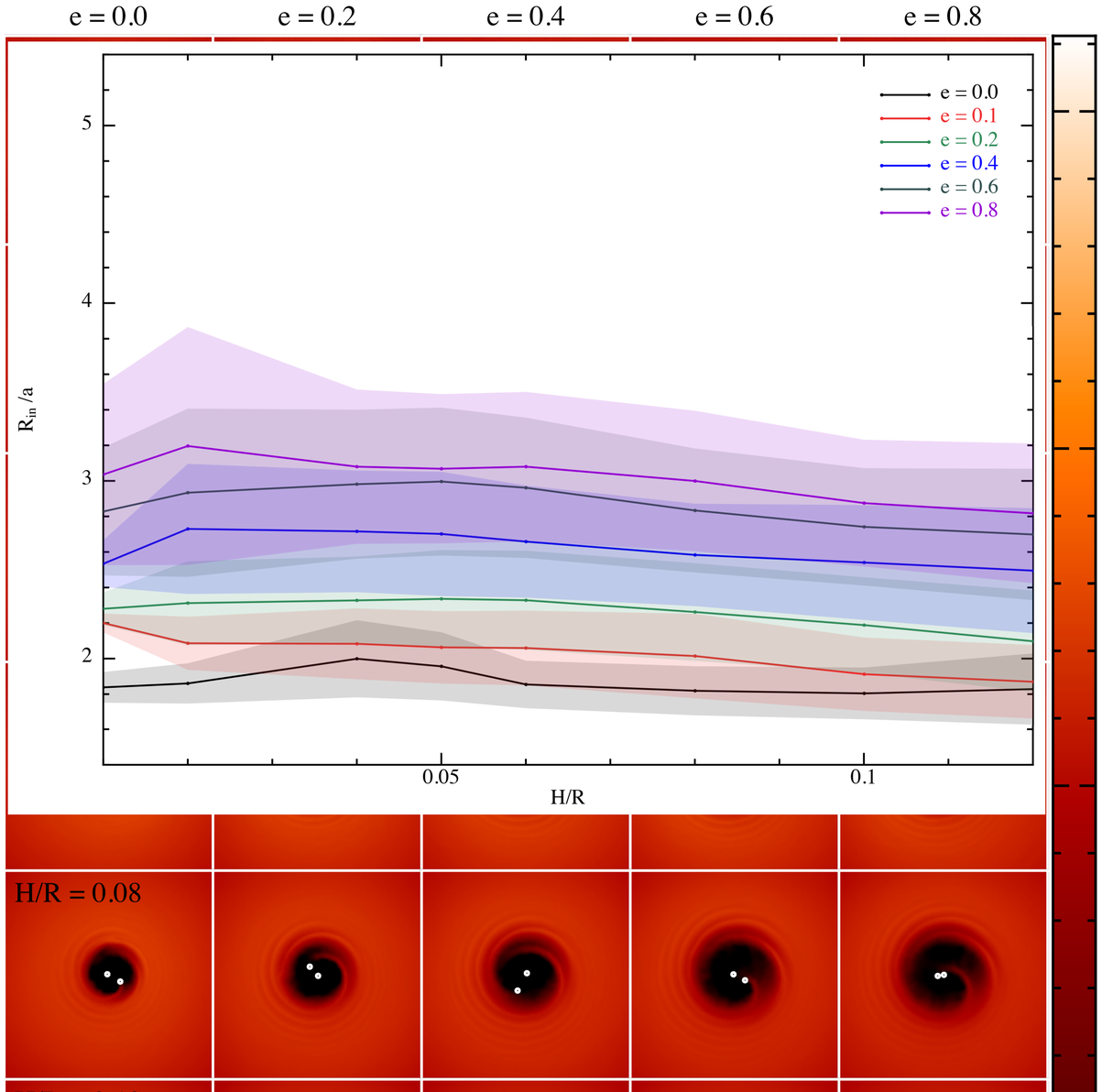
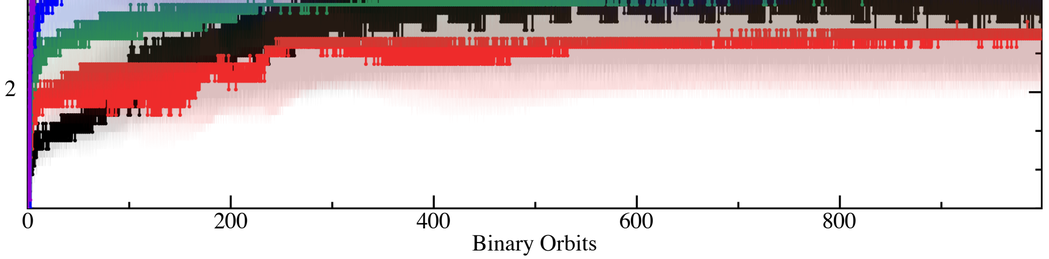
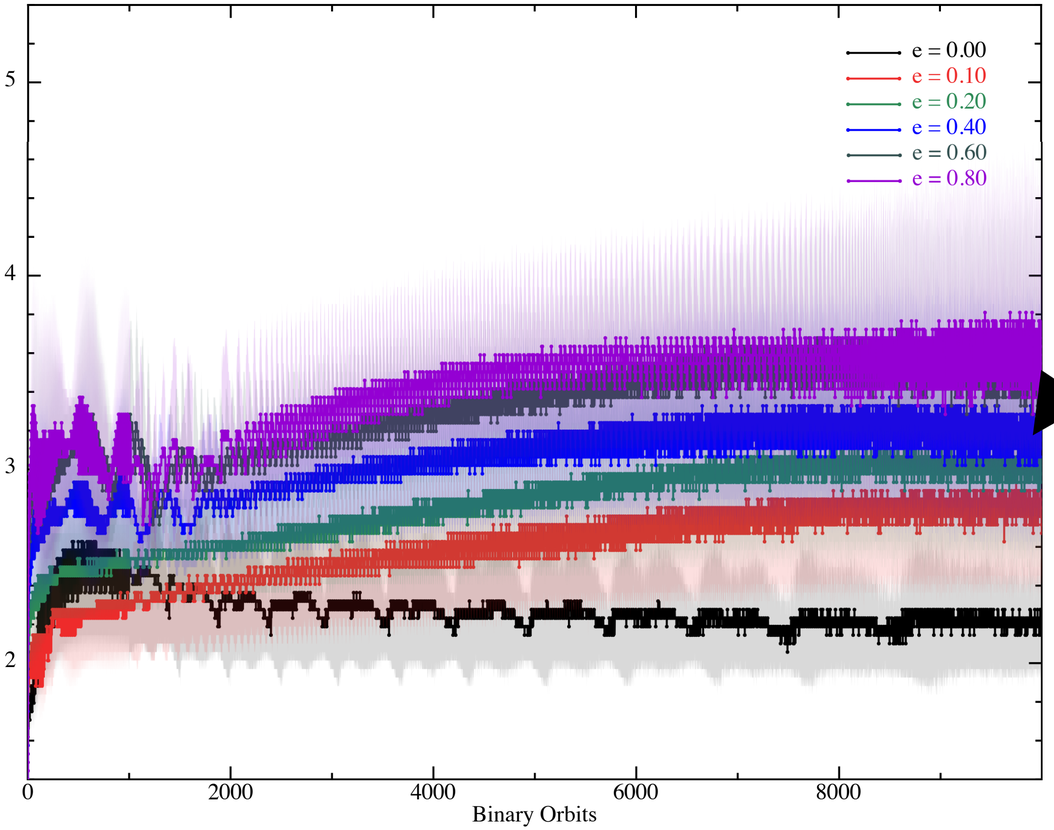
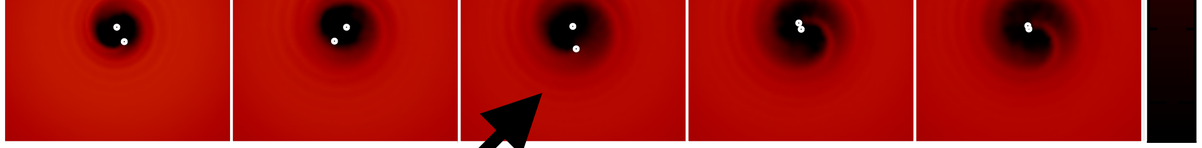
e = 0.10
e = 0.20
e = 0.40
e = 0.60
e = 0.80
R_{in}/a
Binary Orbits


e = 0.00
e = 0.10
e = 0.20
e = 0.40
e = 0.60
e = 0.80


e = 0.0
e = 0.2
e = 0.4
e = 0.6
e = 0.8
e = 0.0
e = 0.1
e = 0.2
e = 0.4
e = 0.6
e = 0.8
R_{in}/a
H/R
H/R = 0.08
-4
-5
-6







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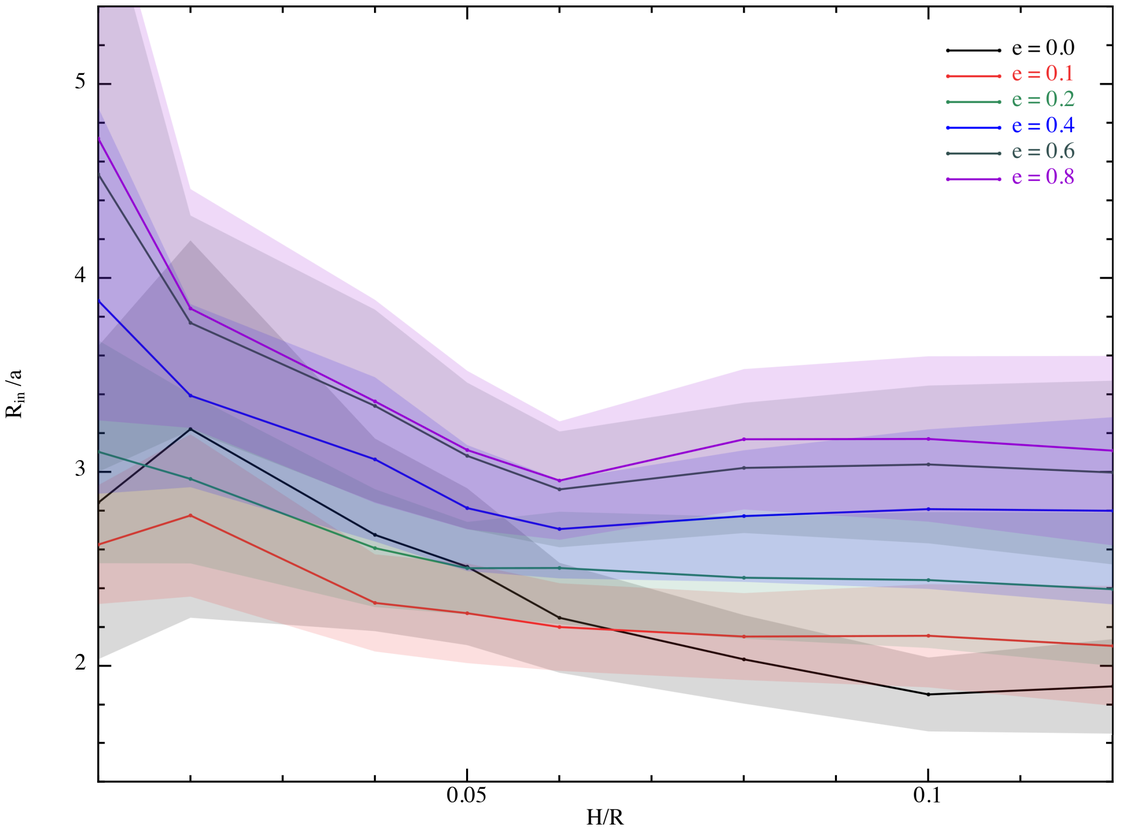

Miranda R., Lai D., 2015, MNRAS, 452, 2396
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Price D. J., et al., 2018a, Publ. Astron. Soc. Australia
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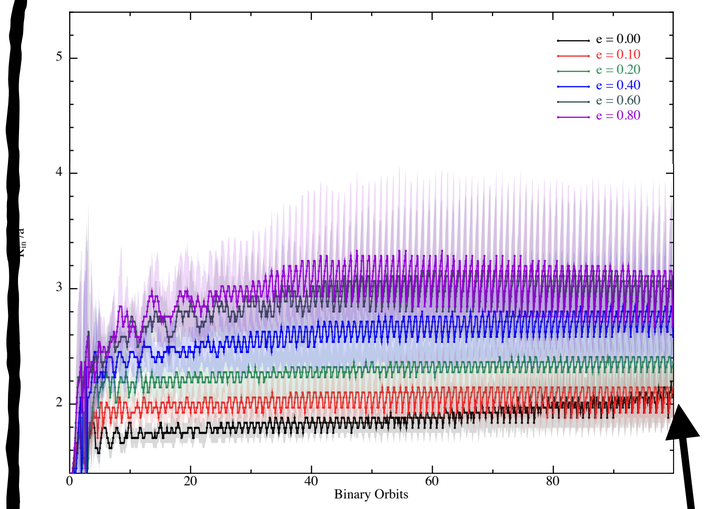
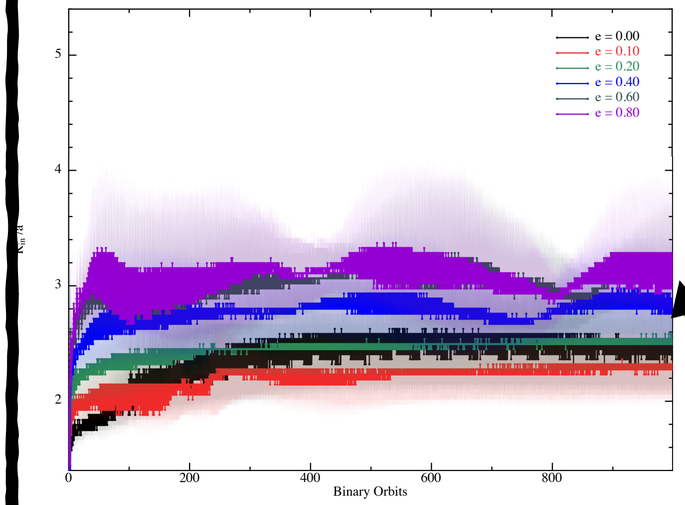
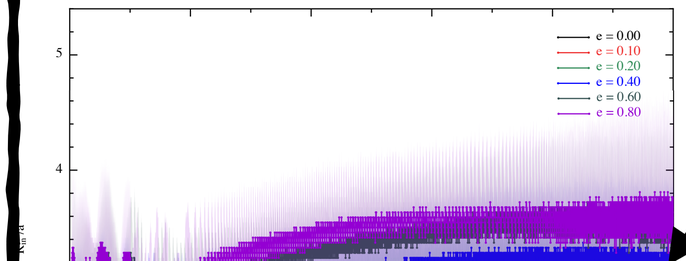
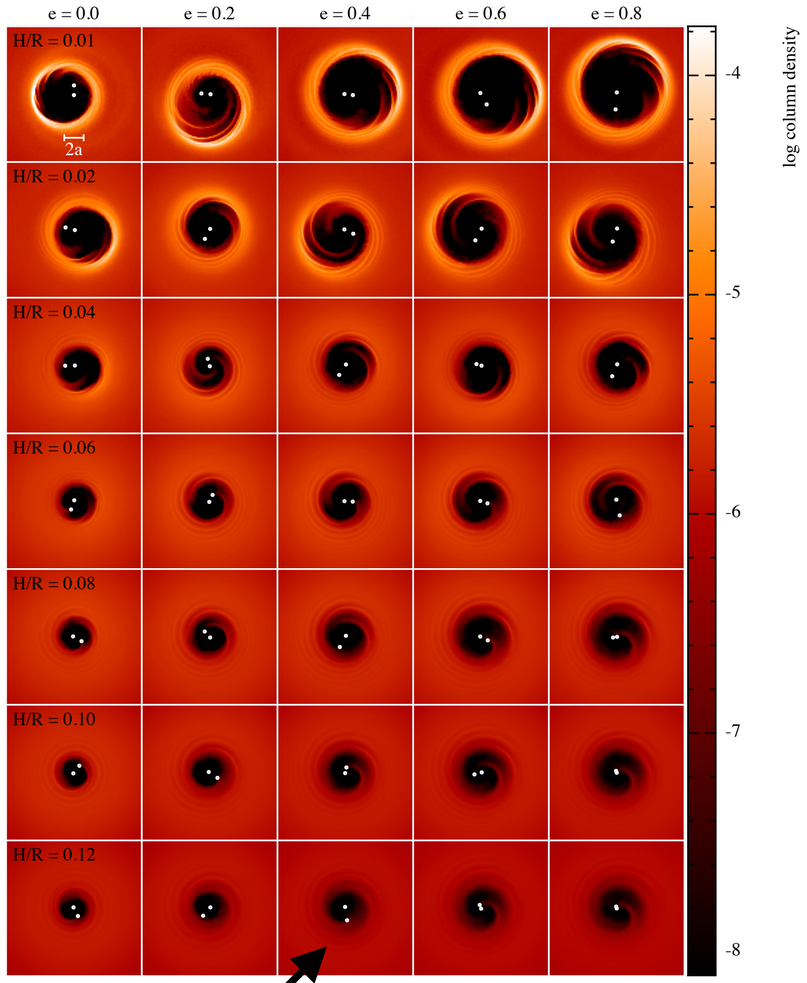
Viscosity?









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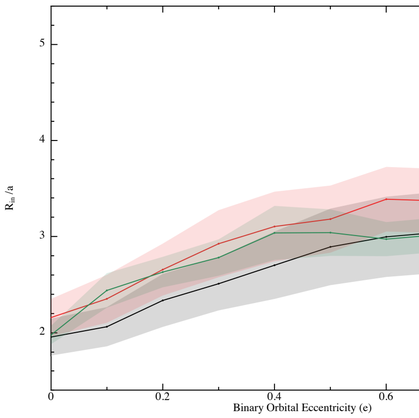
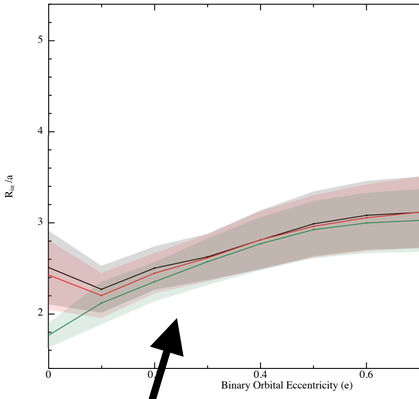
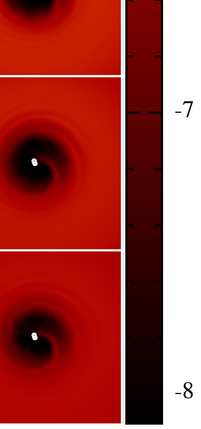
Binar



Largest cavities (3-4 time
are seen around intermed



Cavity size is **independent**



viscous
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Thun et al.

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24, 337
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, 604, A102
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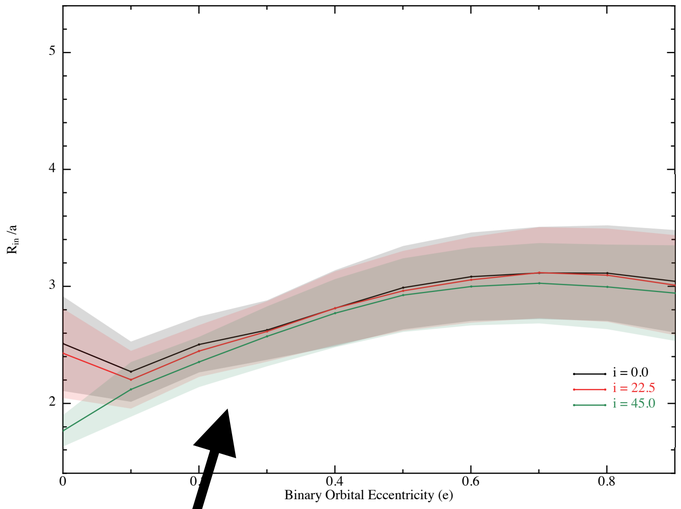
Disc Inclination?



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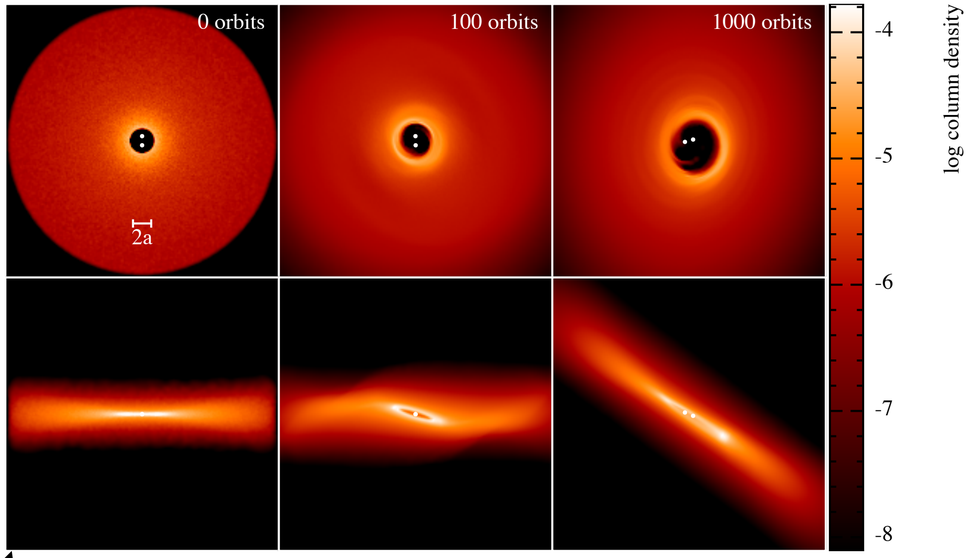
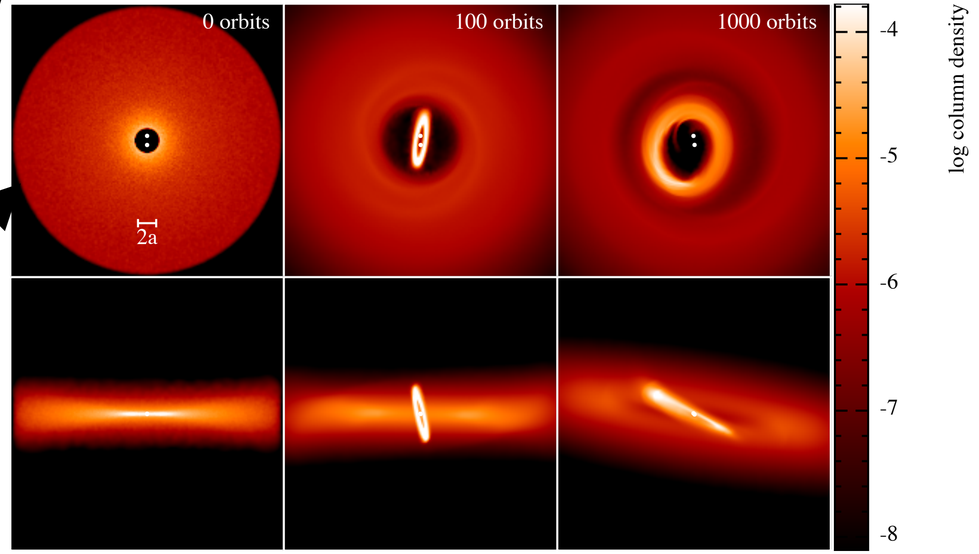
Inclination = 22.5°



Inclination = 45°



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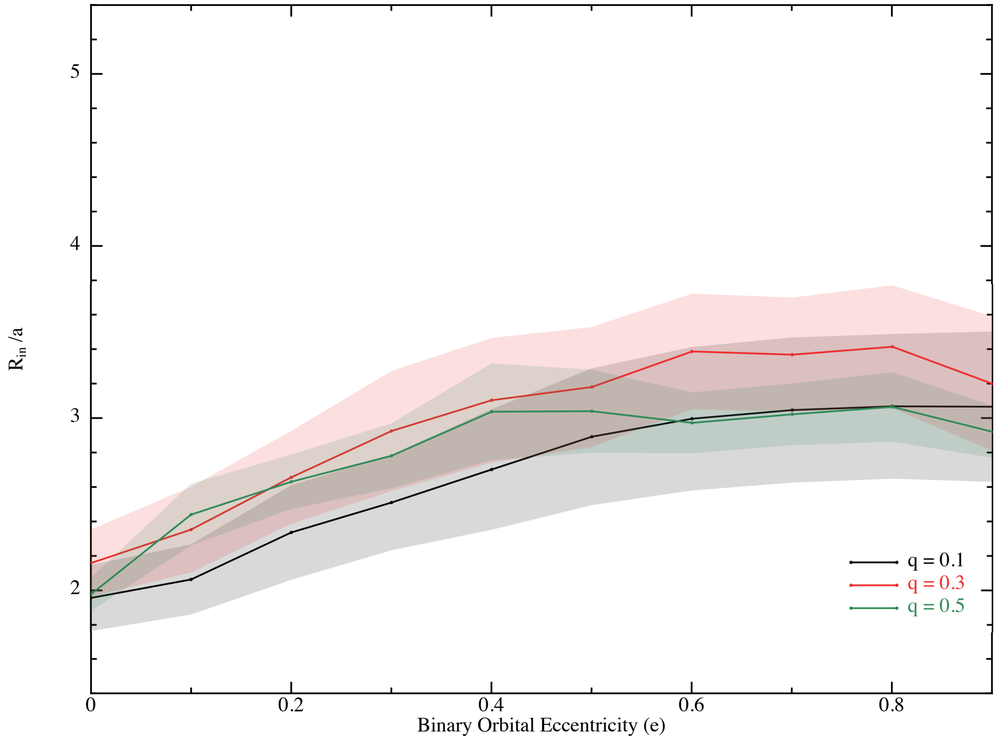

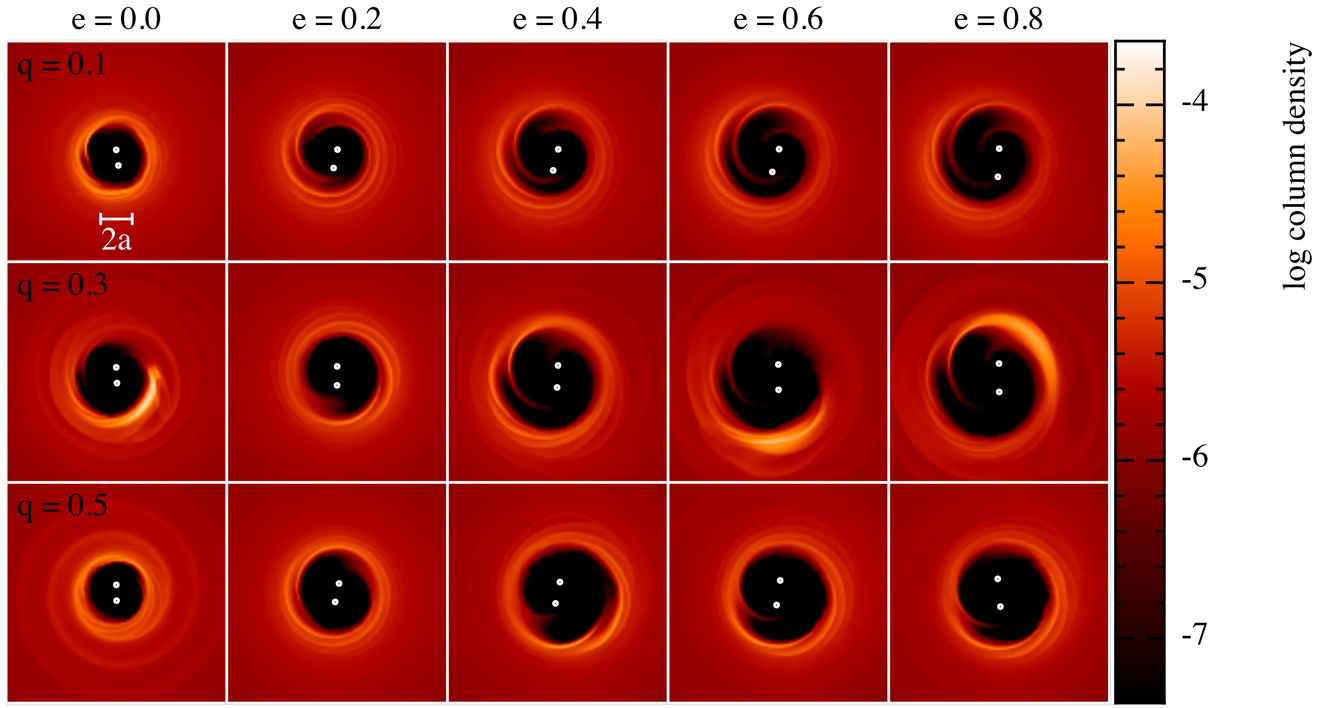

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