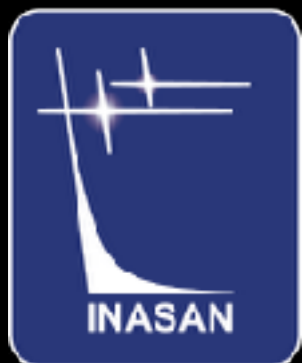




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Venue: Taipei International Convention Center

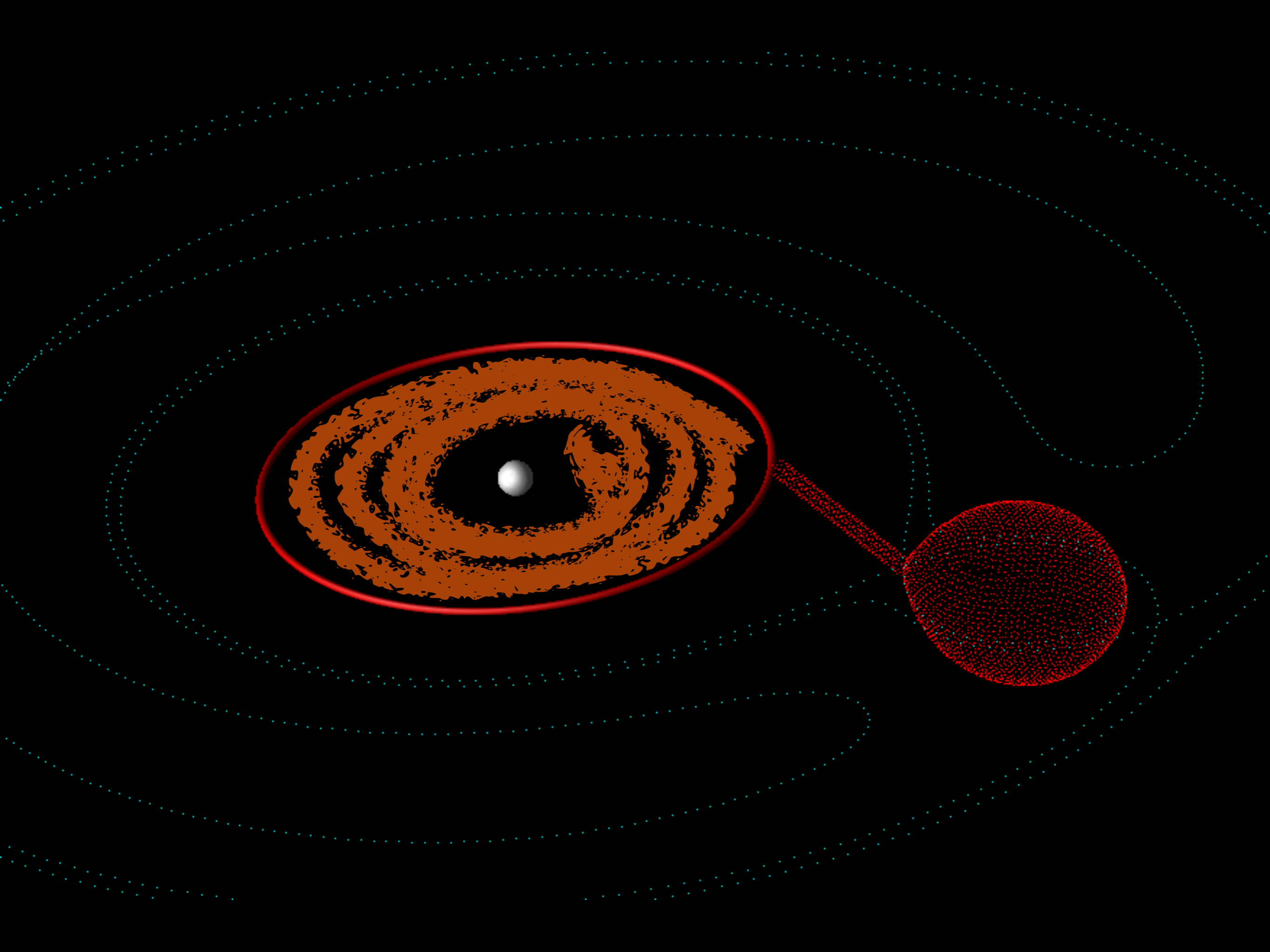
The impact of the stream from L_1 on the shape of the accretion disc in cataclysmic variables

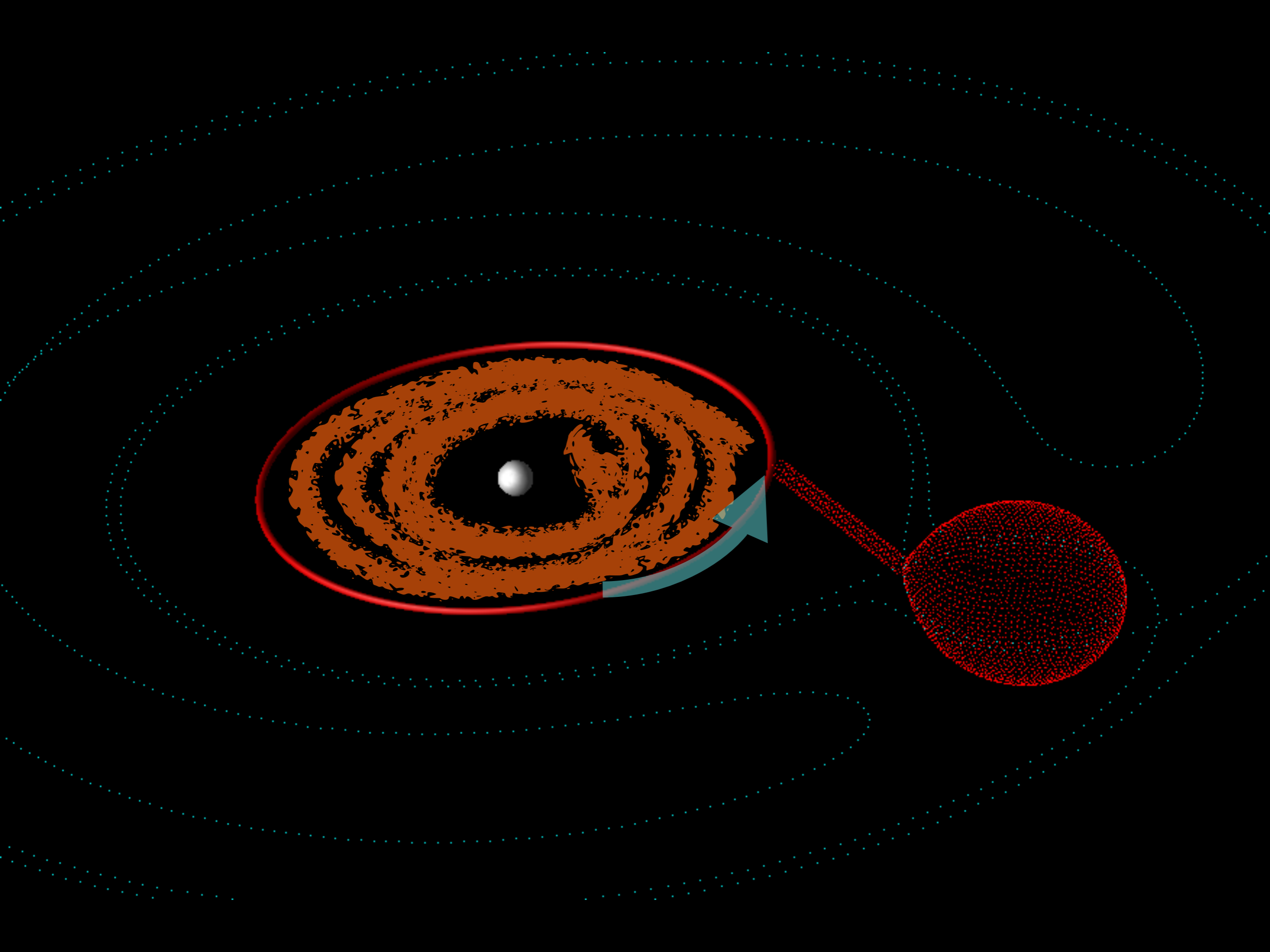
P.V. Kaygorodov, D.V. Bisikalo,
E.P. Kurbatov

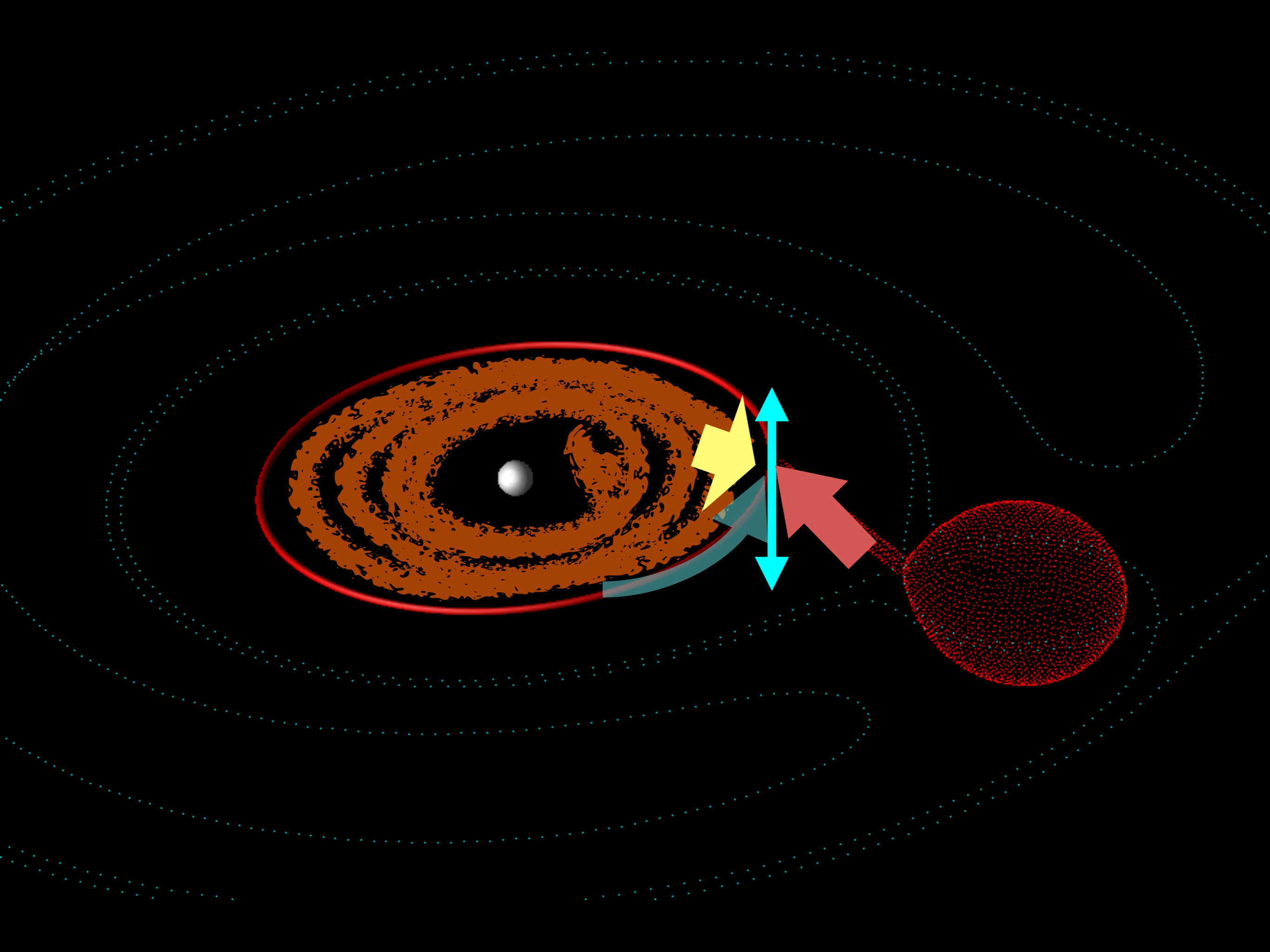


APRIM 2017

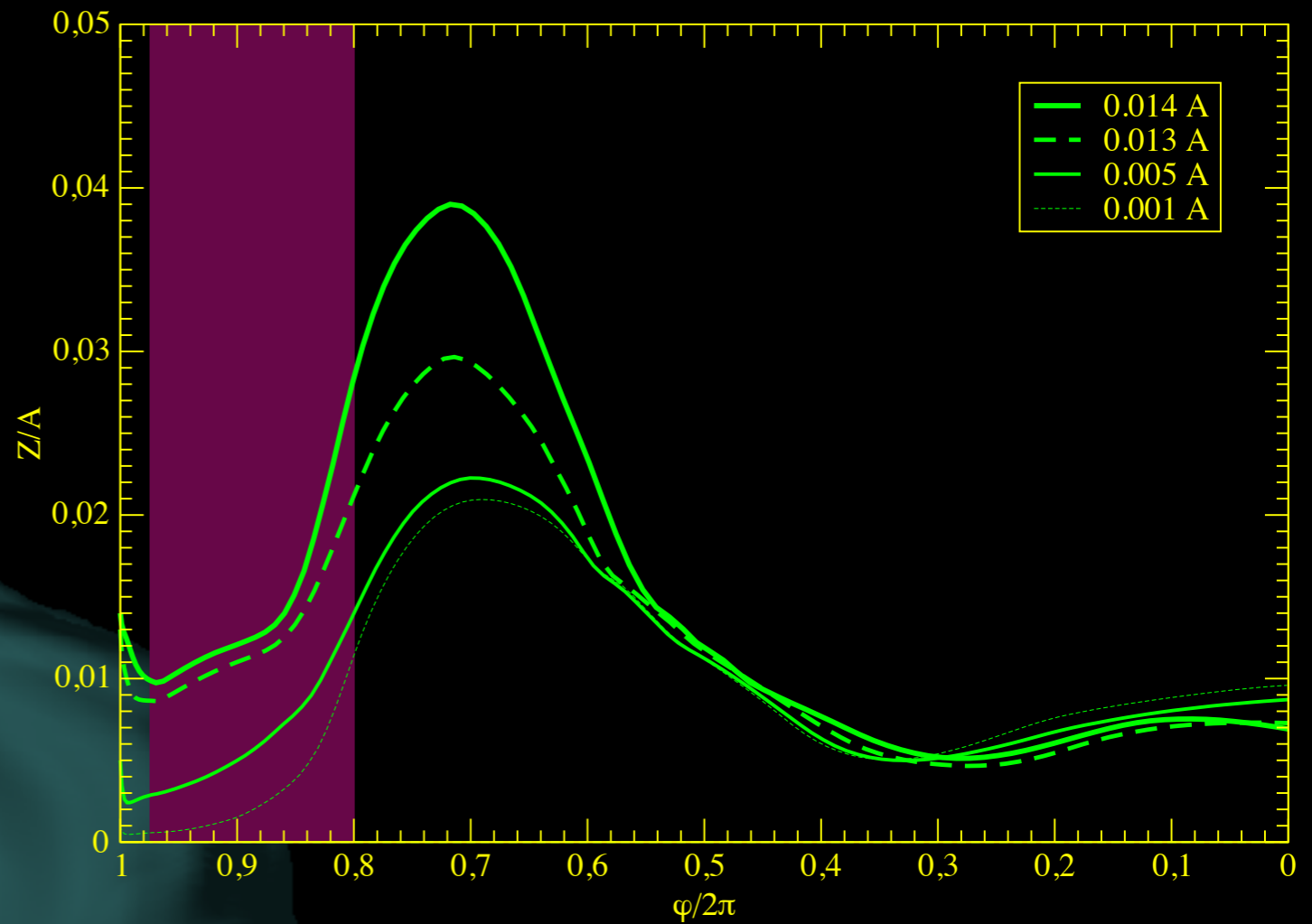


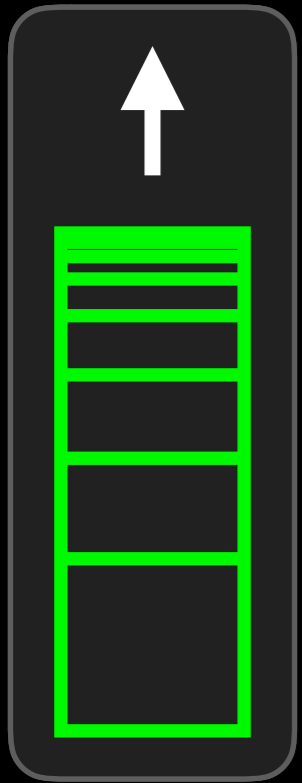






Structure of accretion disk





$$D = \rho D T$$

$$F \simeq -2 \rho \Omega_K^2 \delta h$$

$$\sqrt{r_d^2 + z^2}$$

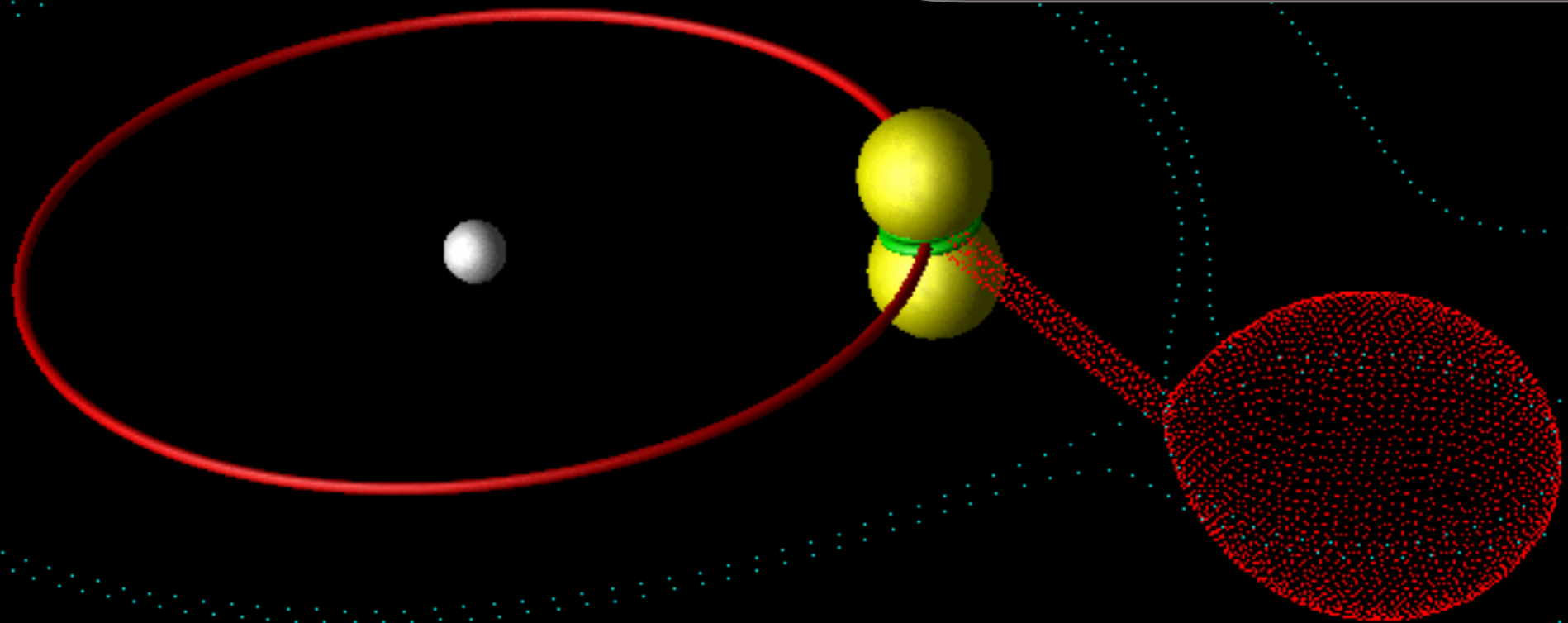
$$\ddot{h} \simeq -2 \Omega_K^2 \delta h$$

$$\rho =$$



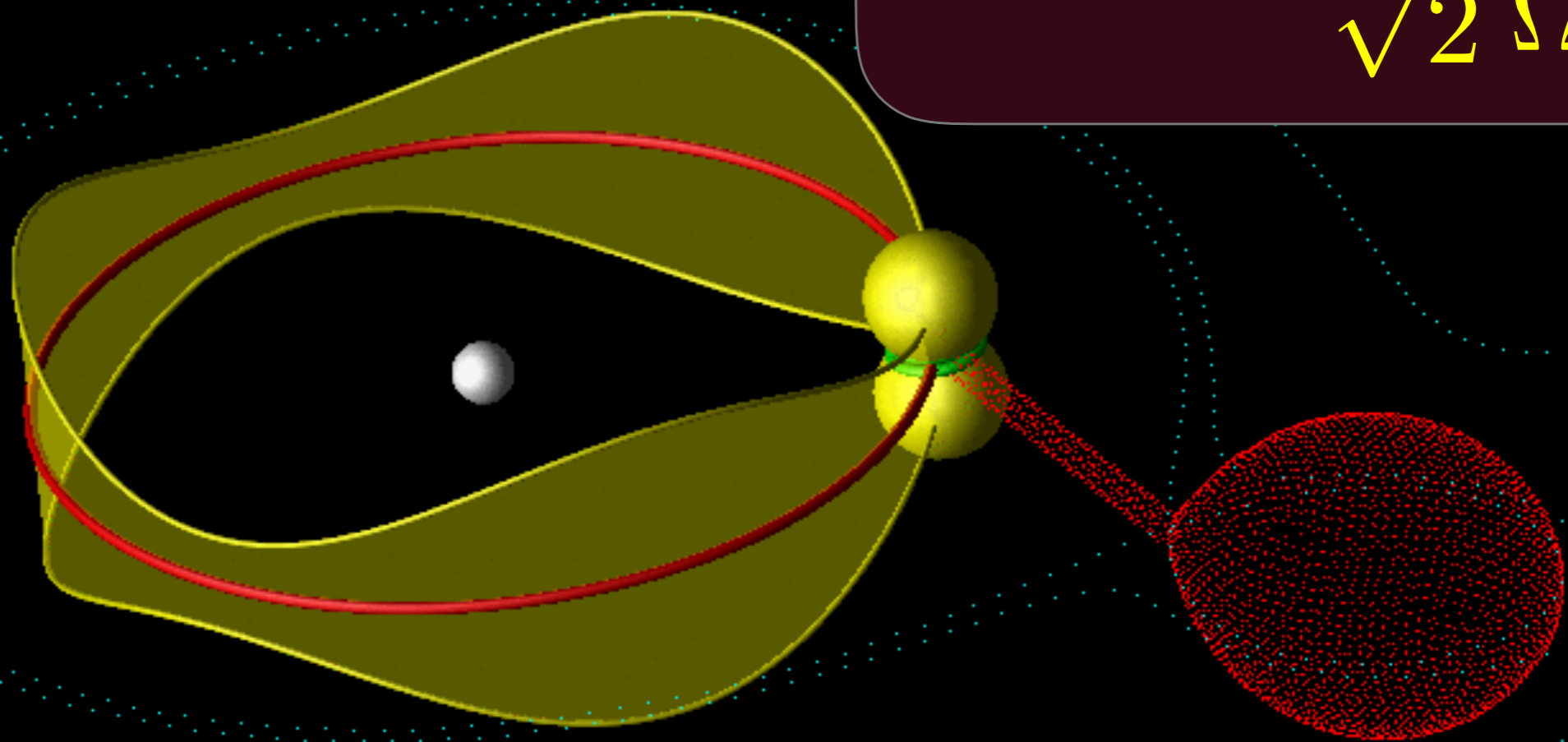
$$\ddot{h} \simeq -2\Omega_K^2 \delta h$$

$$P_{osc} \simeq \frac{1}{\sqrt{2}} \frac{2\pi}{\Omega_K}$$

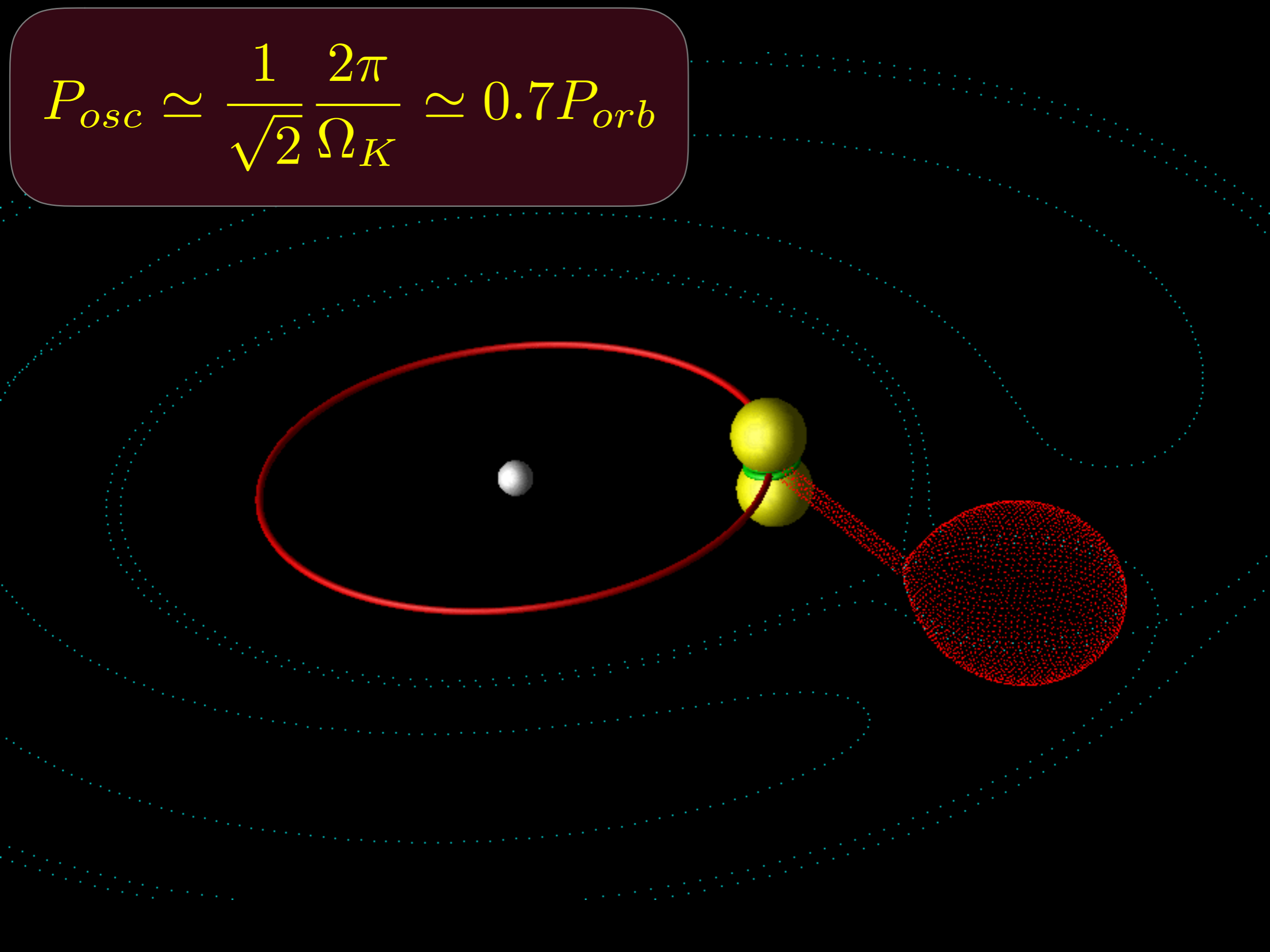


$$\ddot{h} \simeq -2\Omega_K^2 \delta h$$

$$P_{osc} \simeq \frac{1}{\sqrt{2}} \frac{2\pi}{\Omega_K}$$



$$P_{osc} \simeq \frac{1}{\sqrt{2}} \frac{2\pi}{\Omega_K} \simeq 0.7 P_{orb}$$



$$\frac{P_{edg}}{P_{osc}} = \frac{\sqrt{2}(q+1)}{q+1-0.6^{3/2}}$$

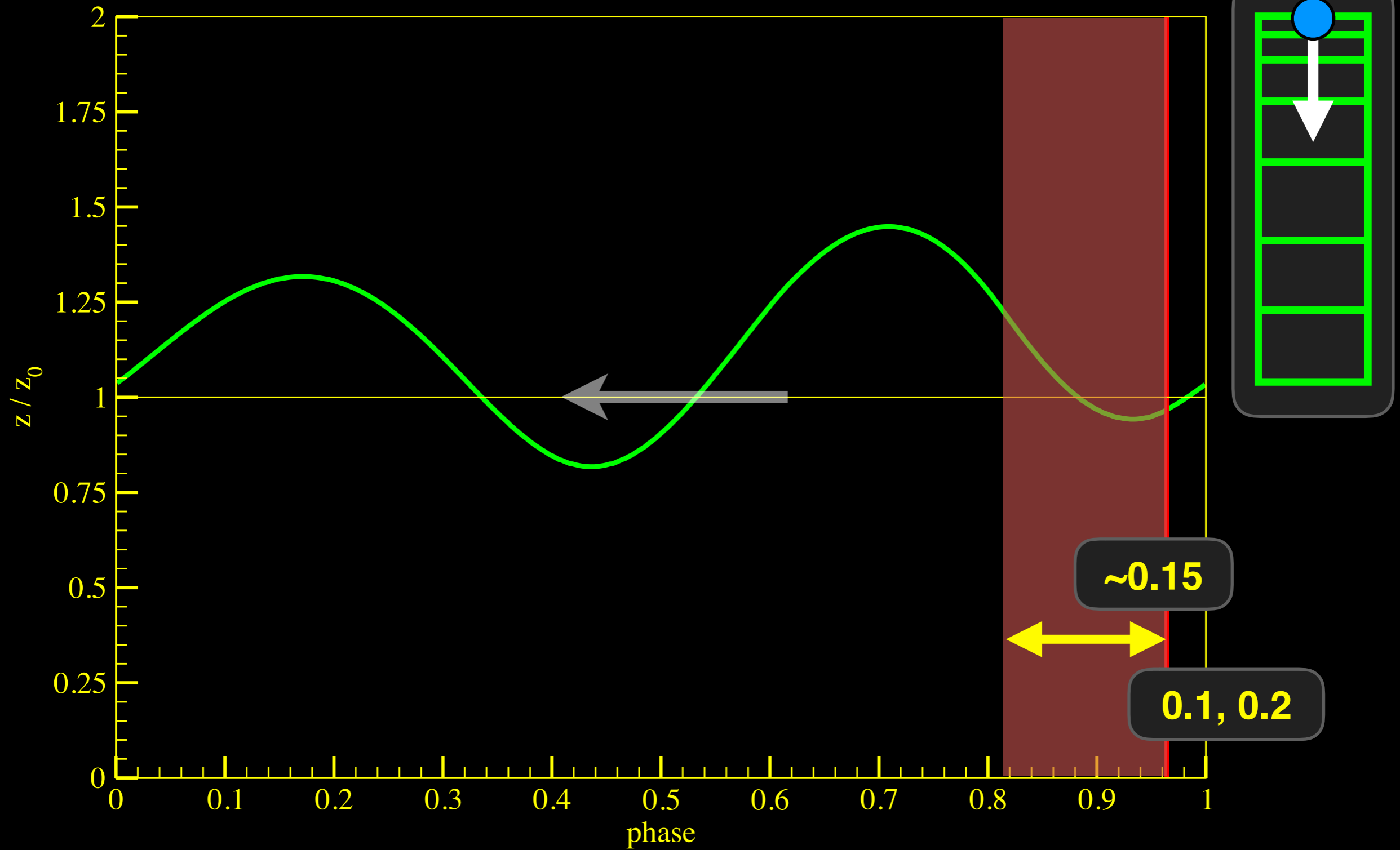
$$0 < q < \infty$$
$$2.6 < N < 1.4$$

$$r_d \simeq A \cdot \frac{0.6}{1+q}$$

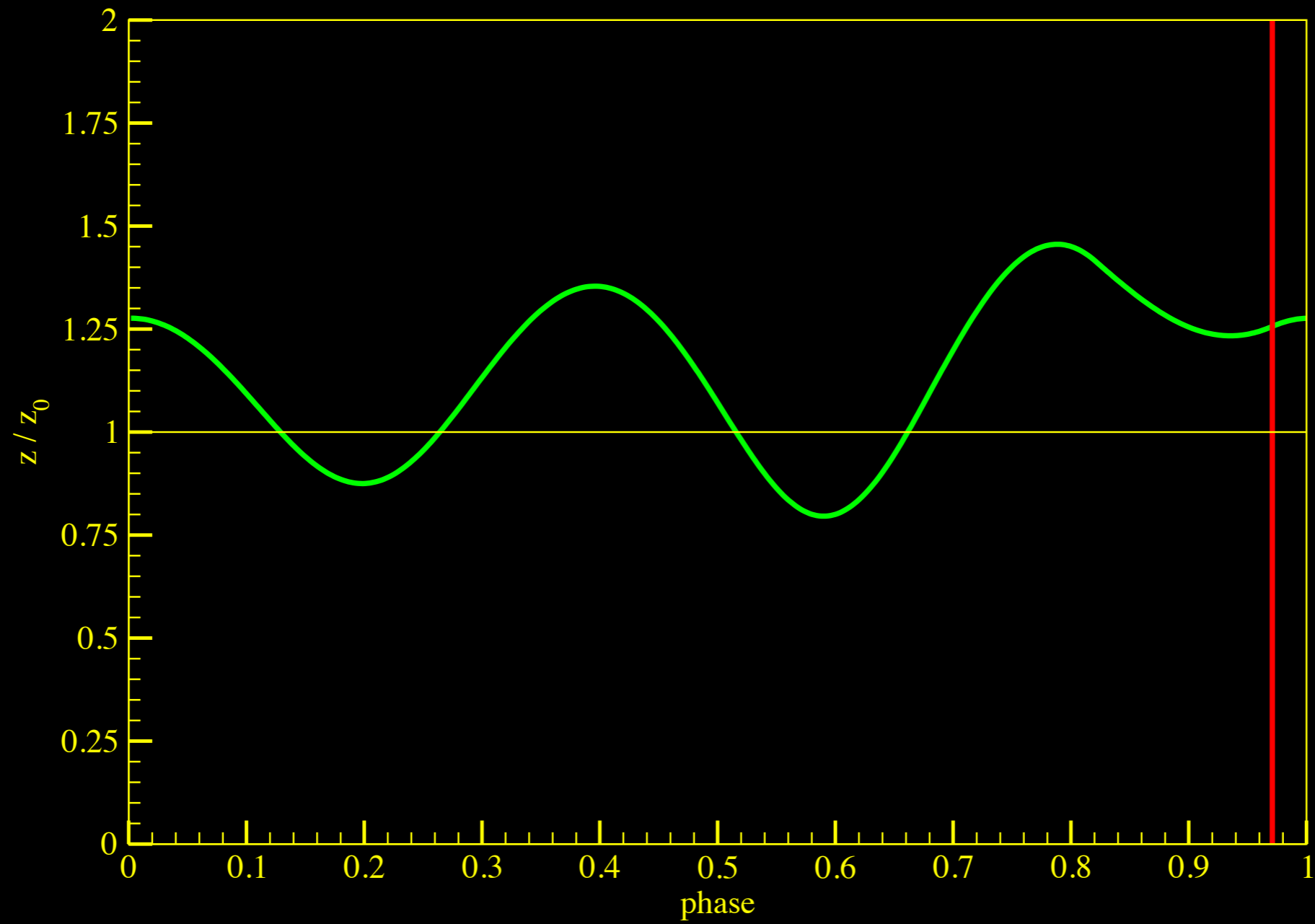
$$q = \frac{M_2}{M_1}$$

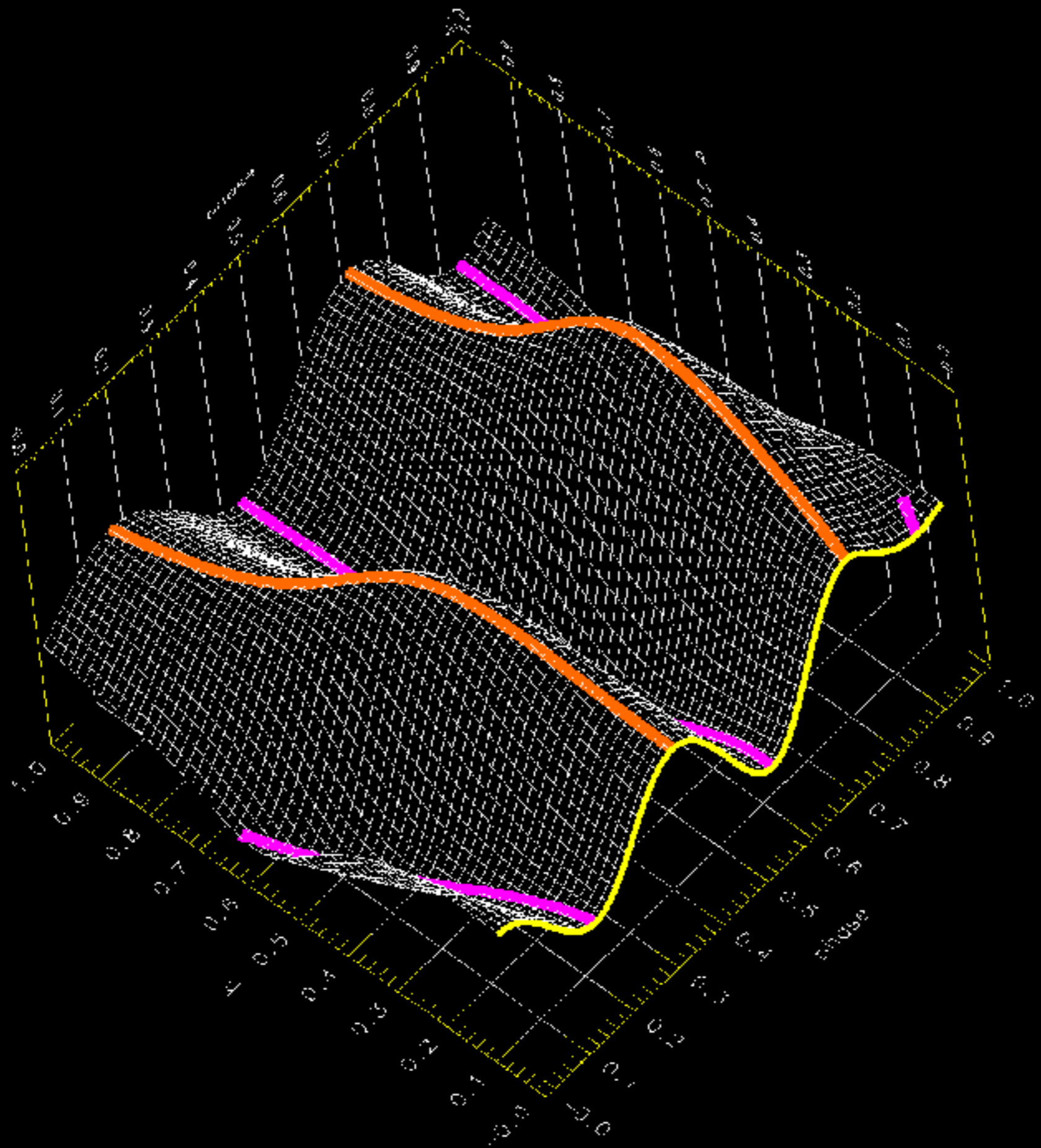
q	N
0.07	2.5
0.6	2
7	1.5

Numerical modeling

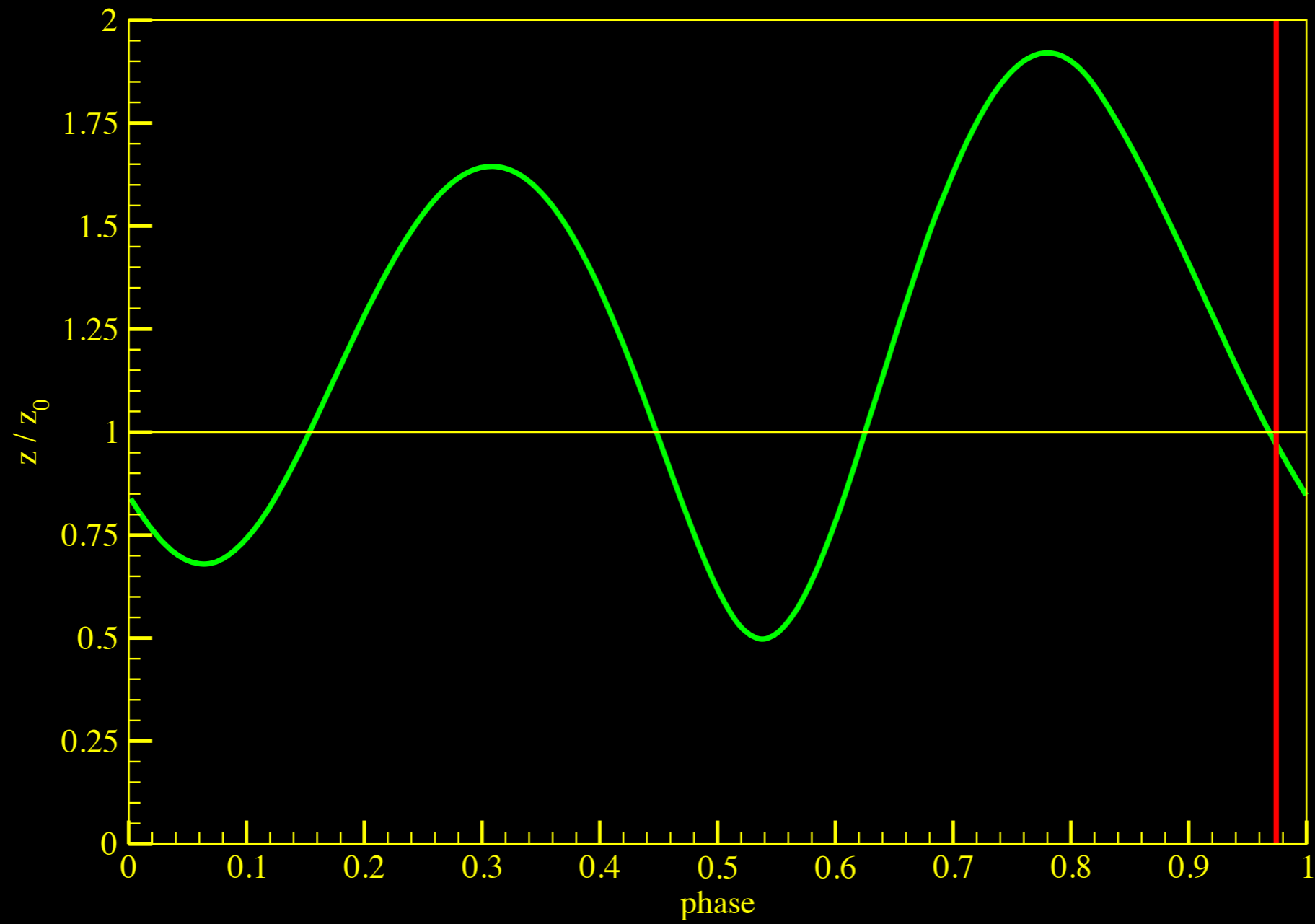


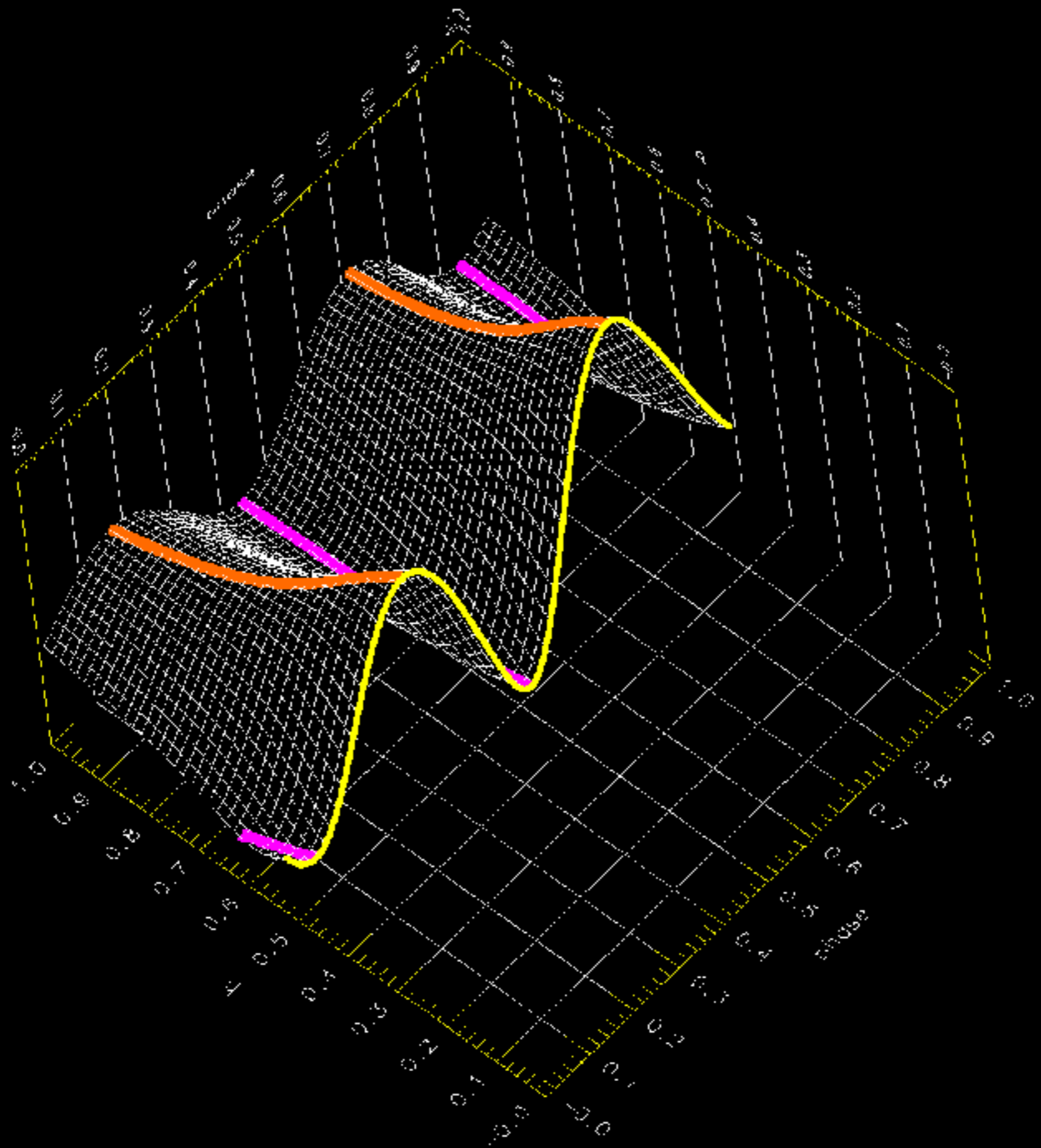
$q=0.05$



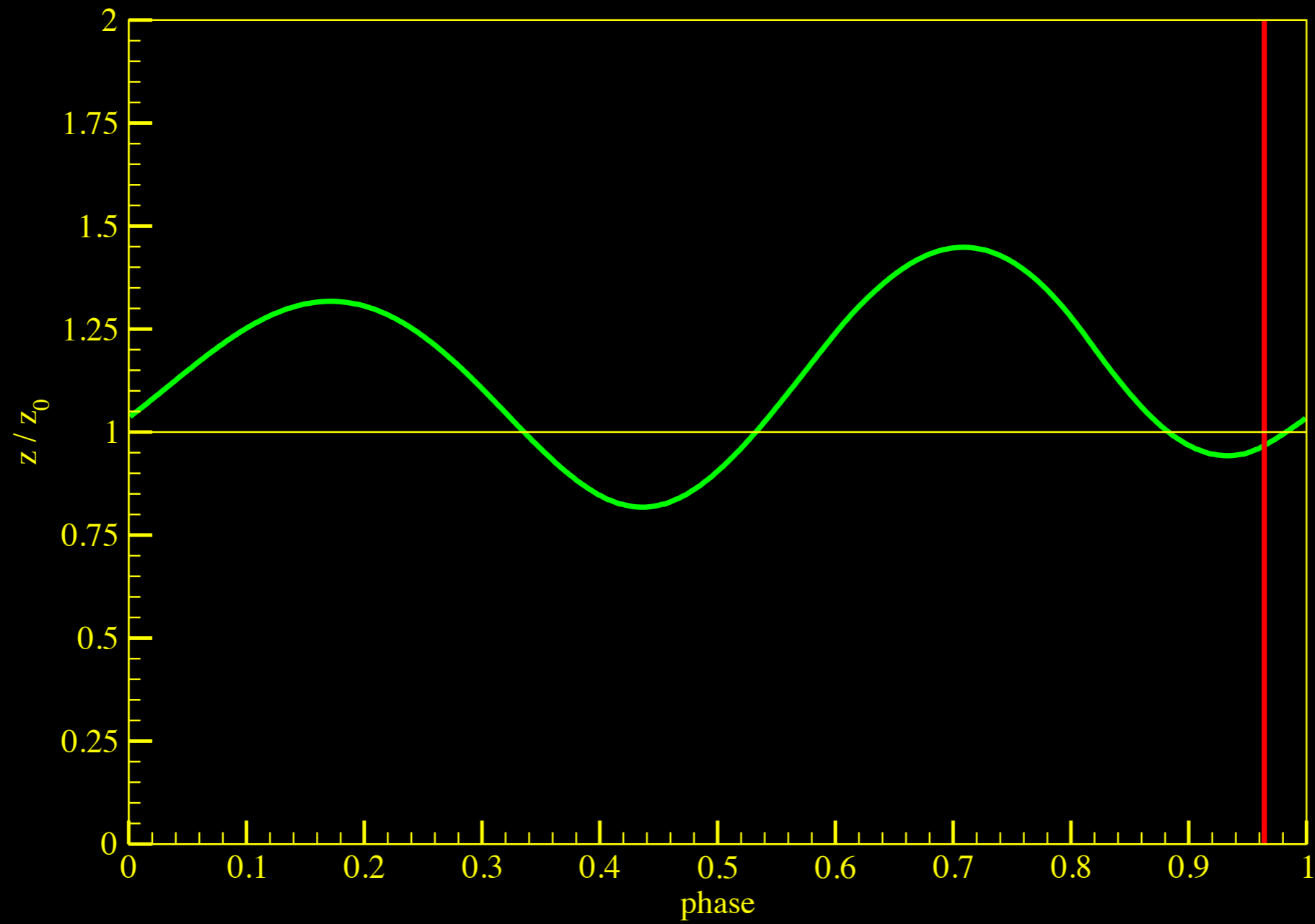


$q=0.5$

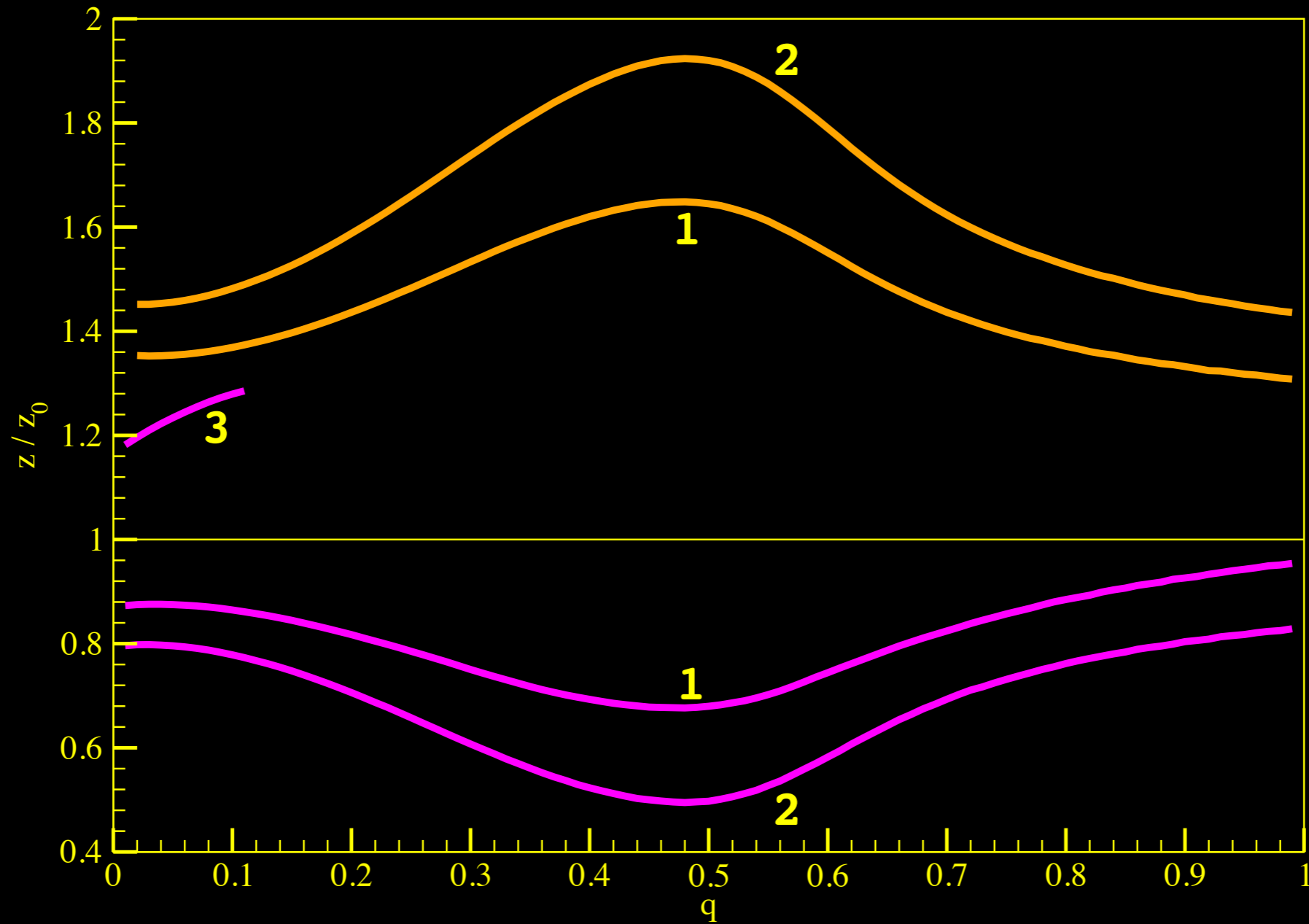




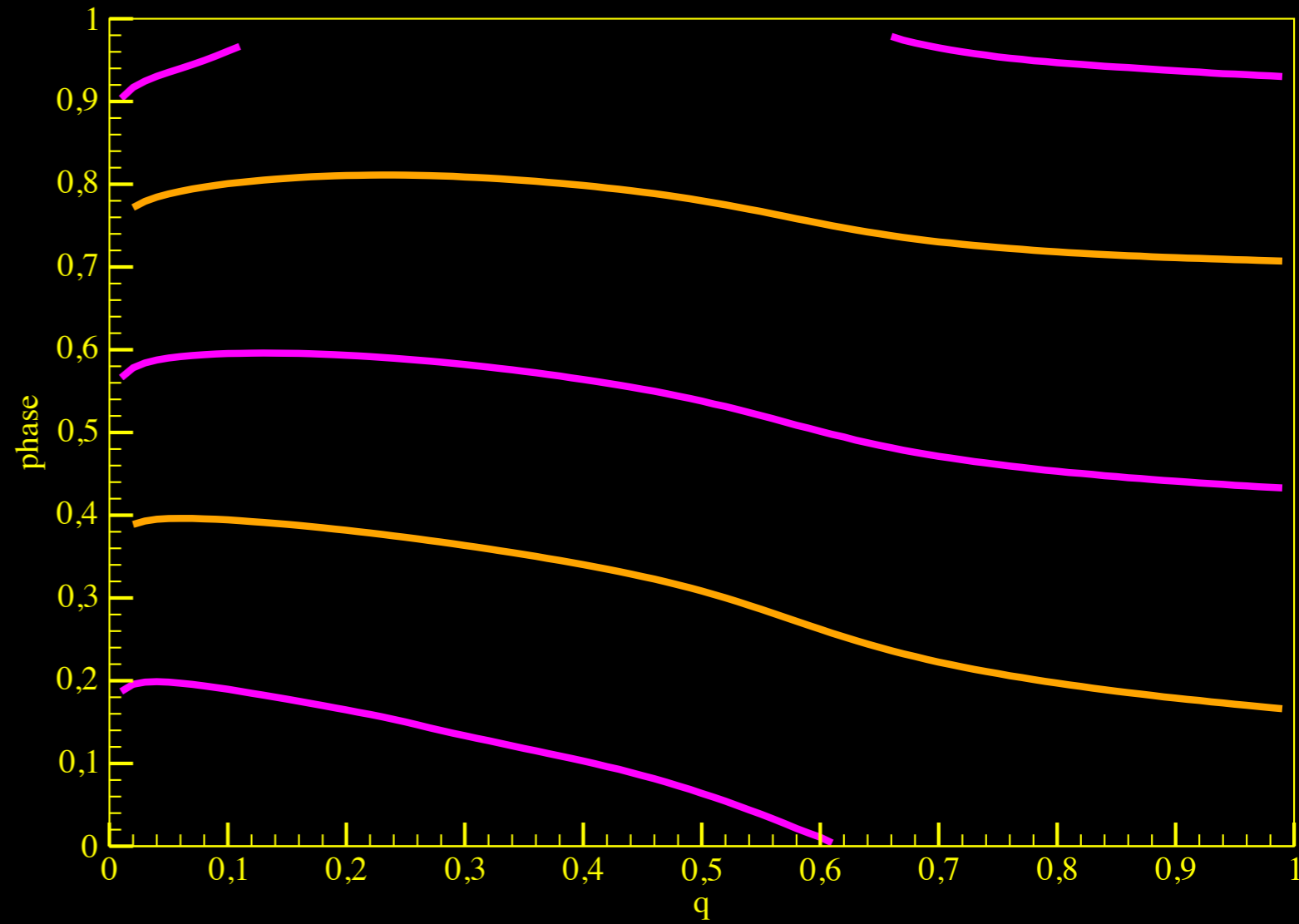
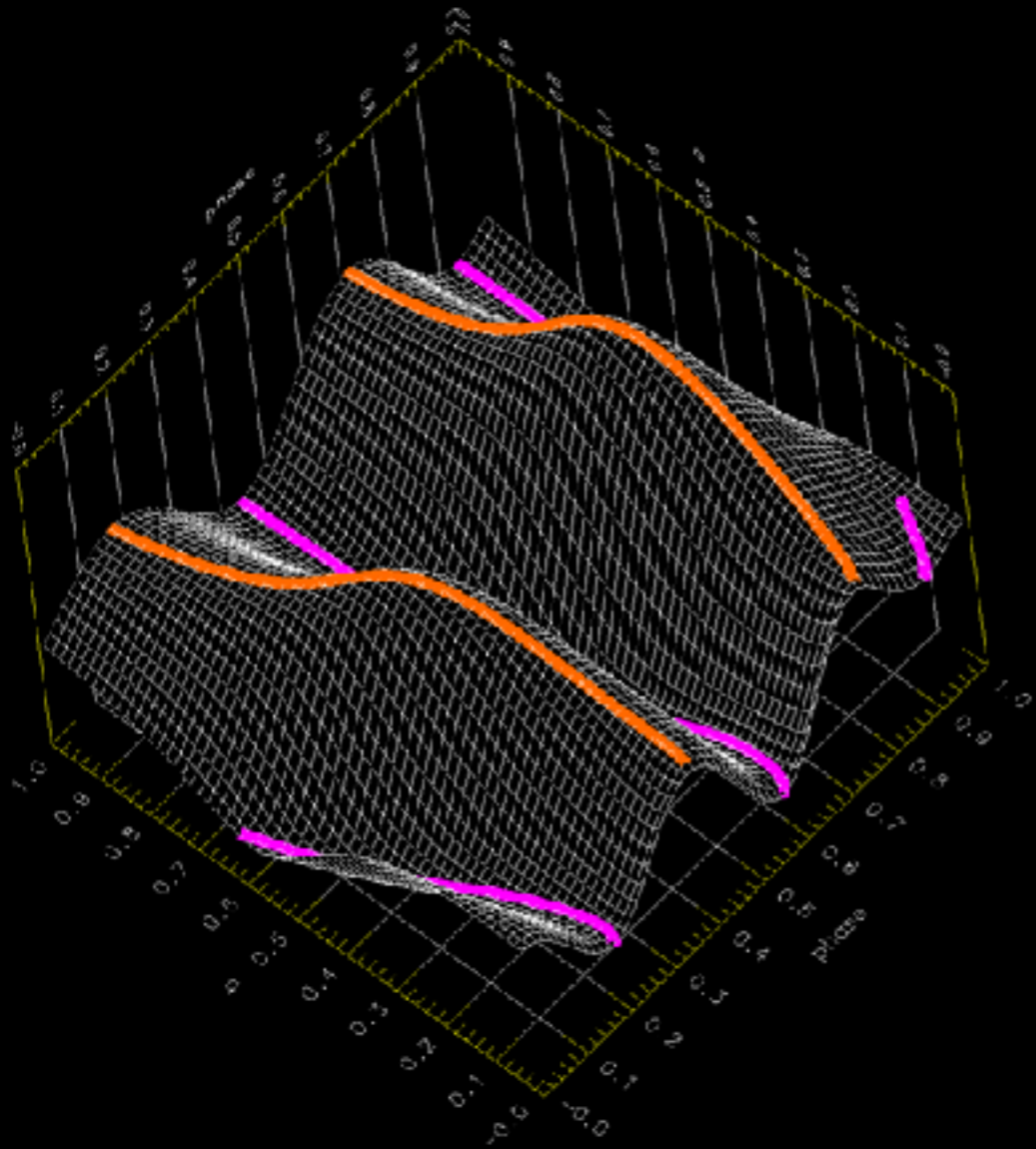
$q=0.95$



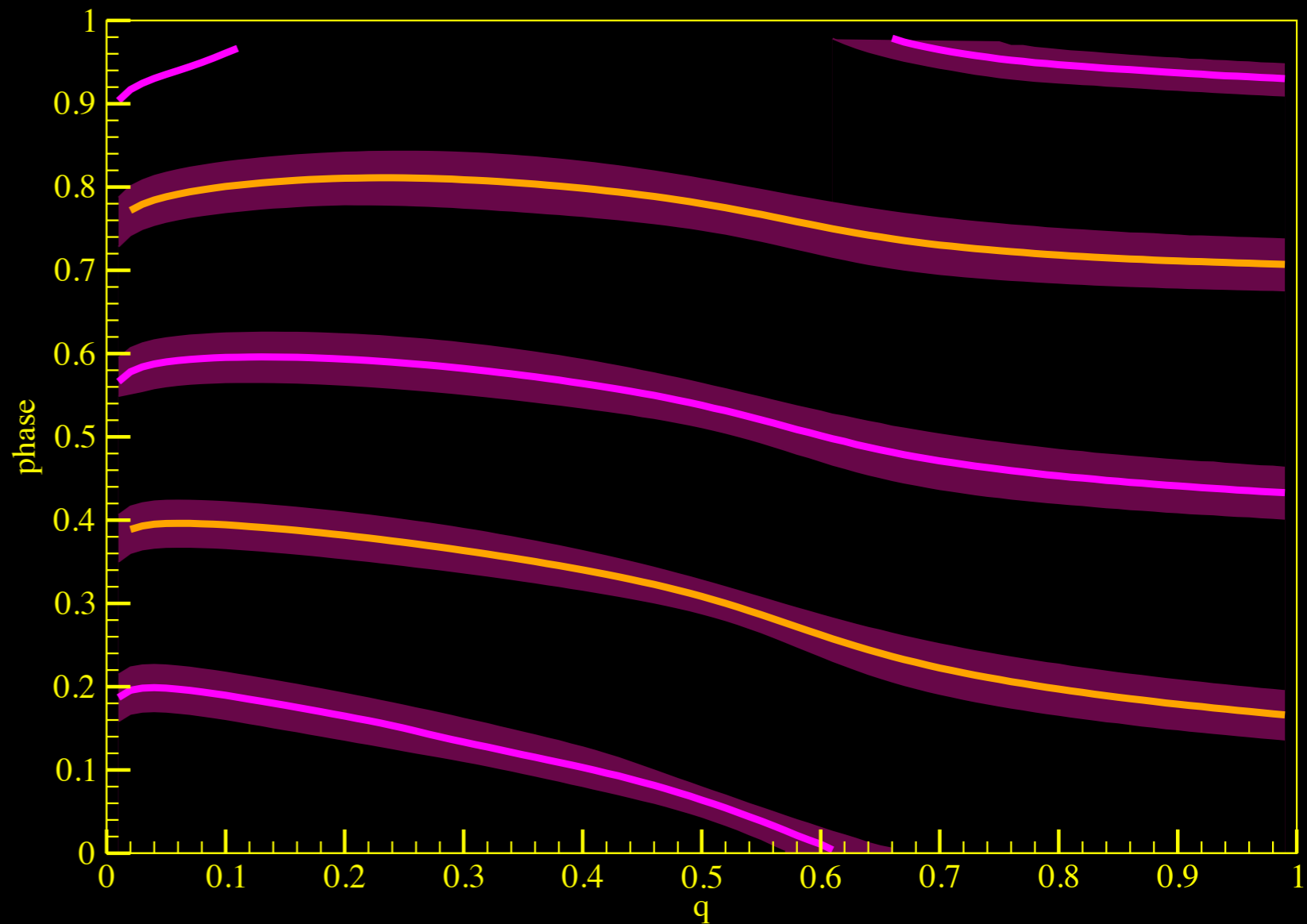
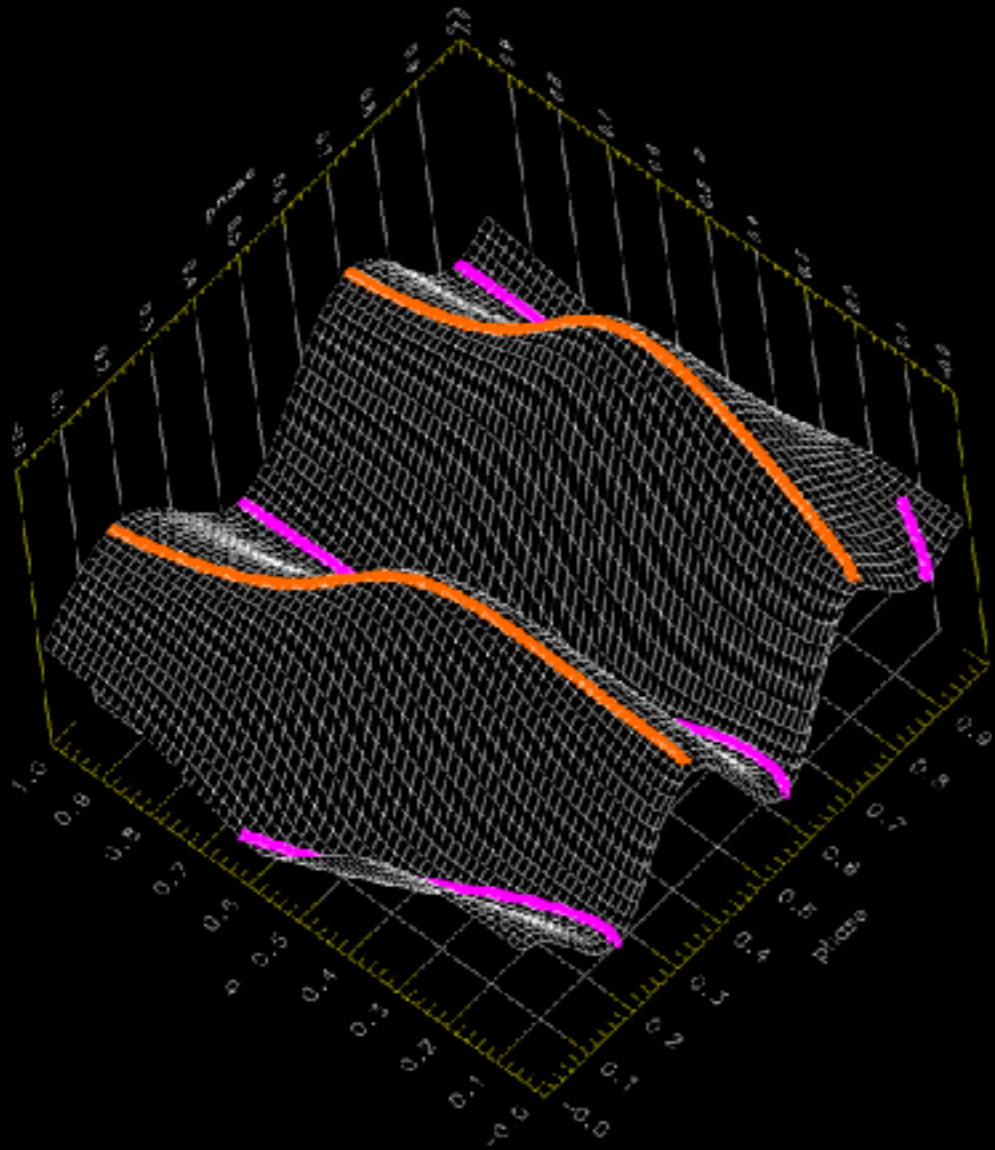
Amplitudes of humps and deeps



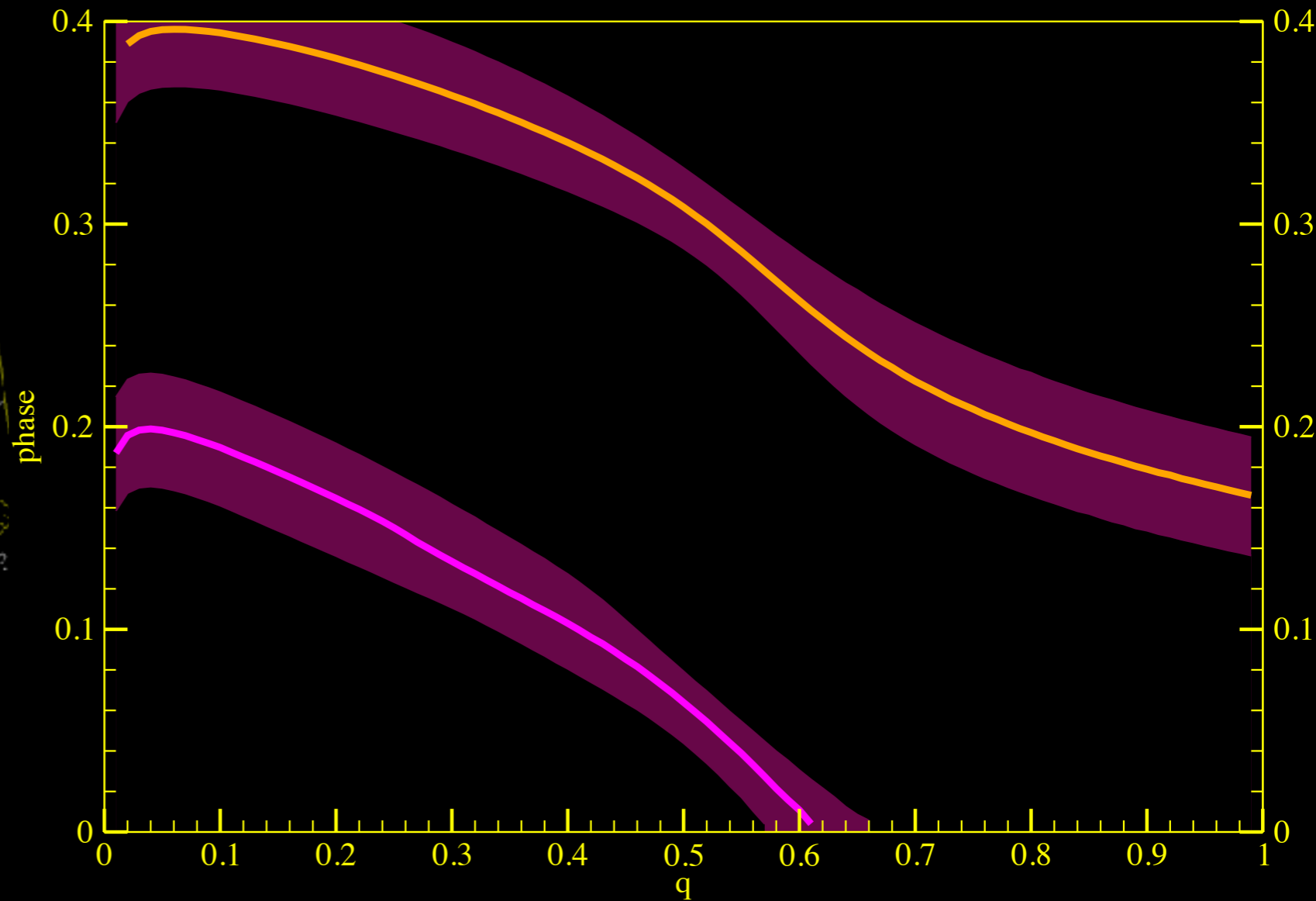
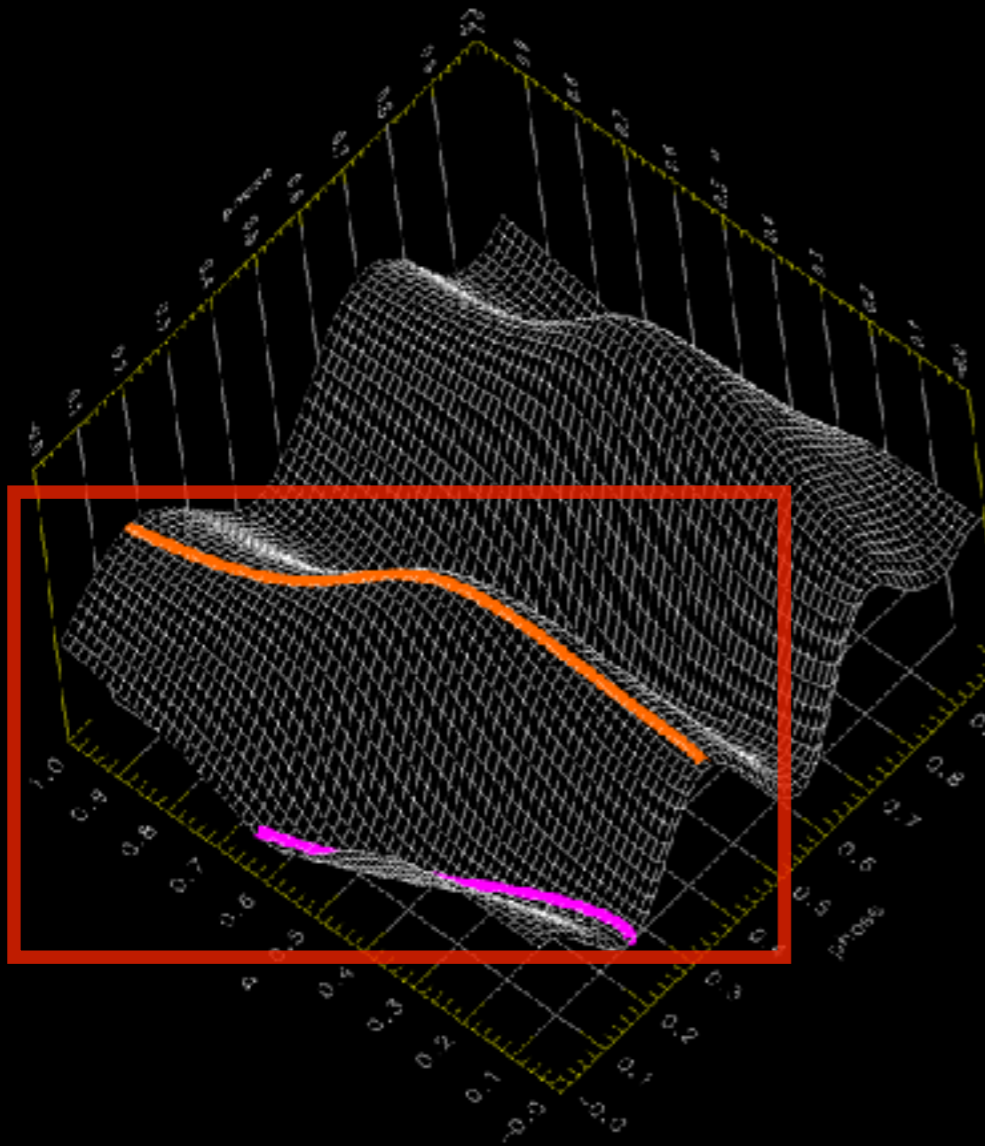
Phases of humps and deeps



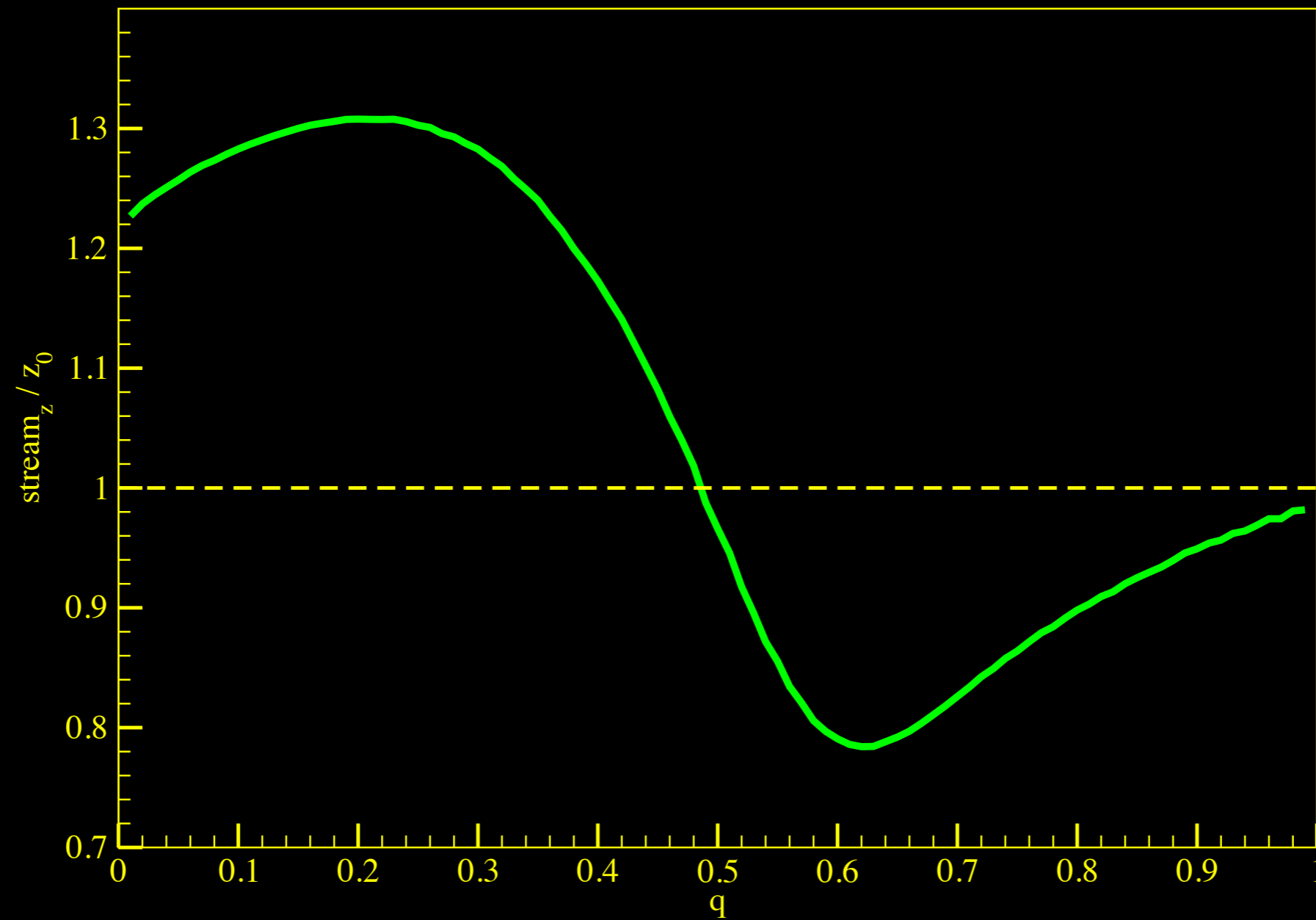
Phases of humps and deeps



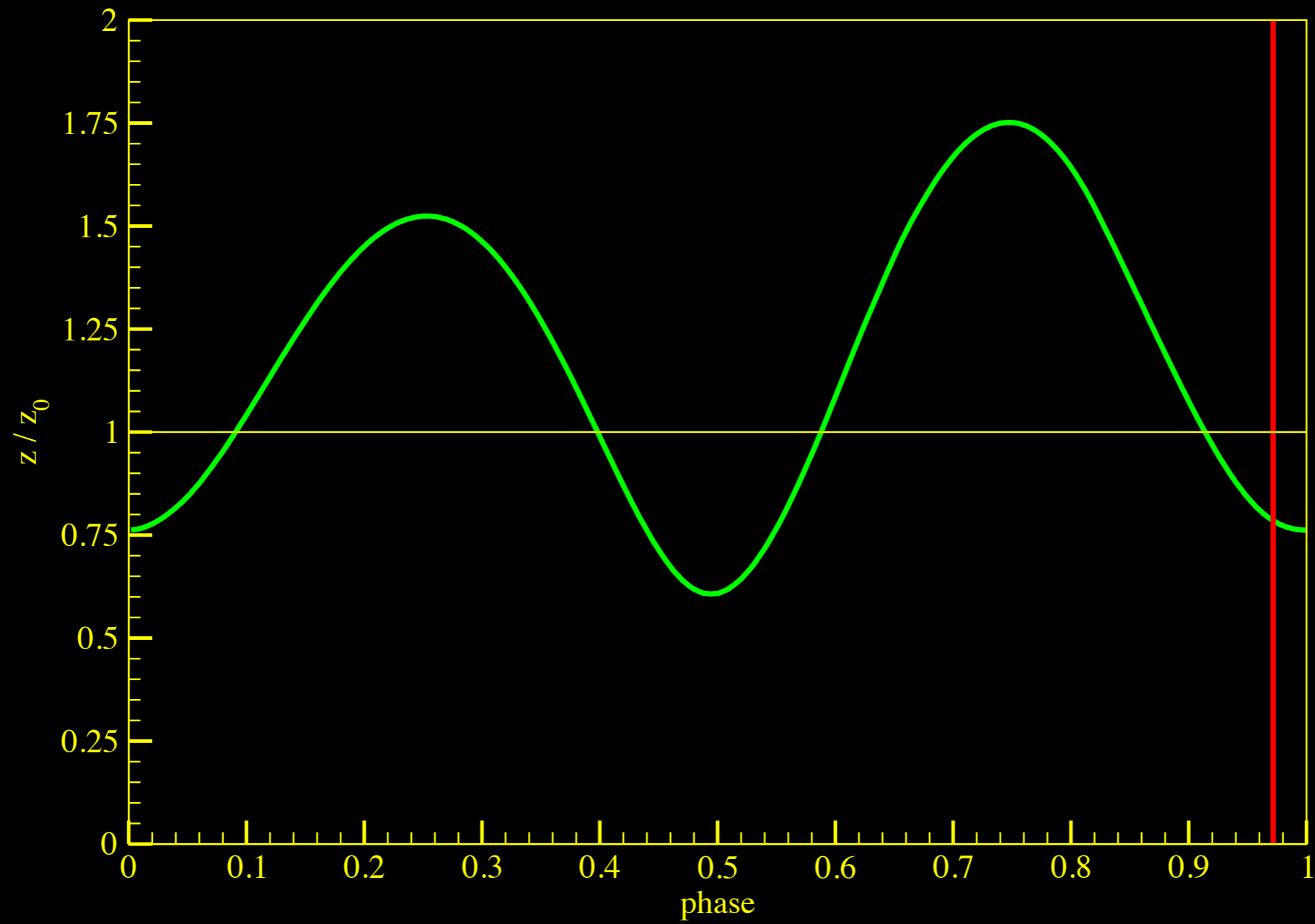
The first hump (and deep) phases



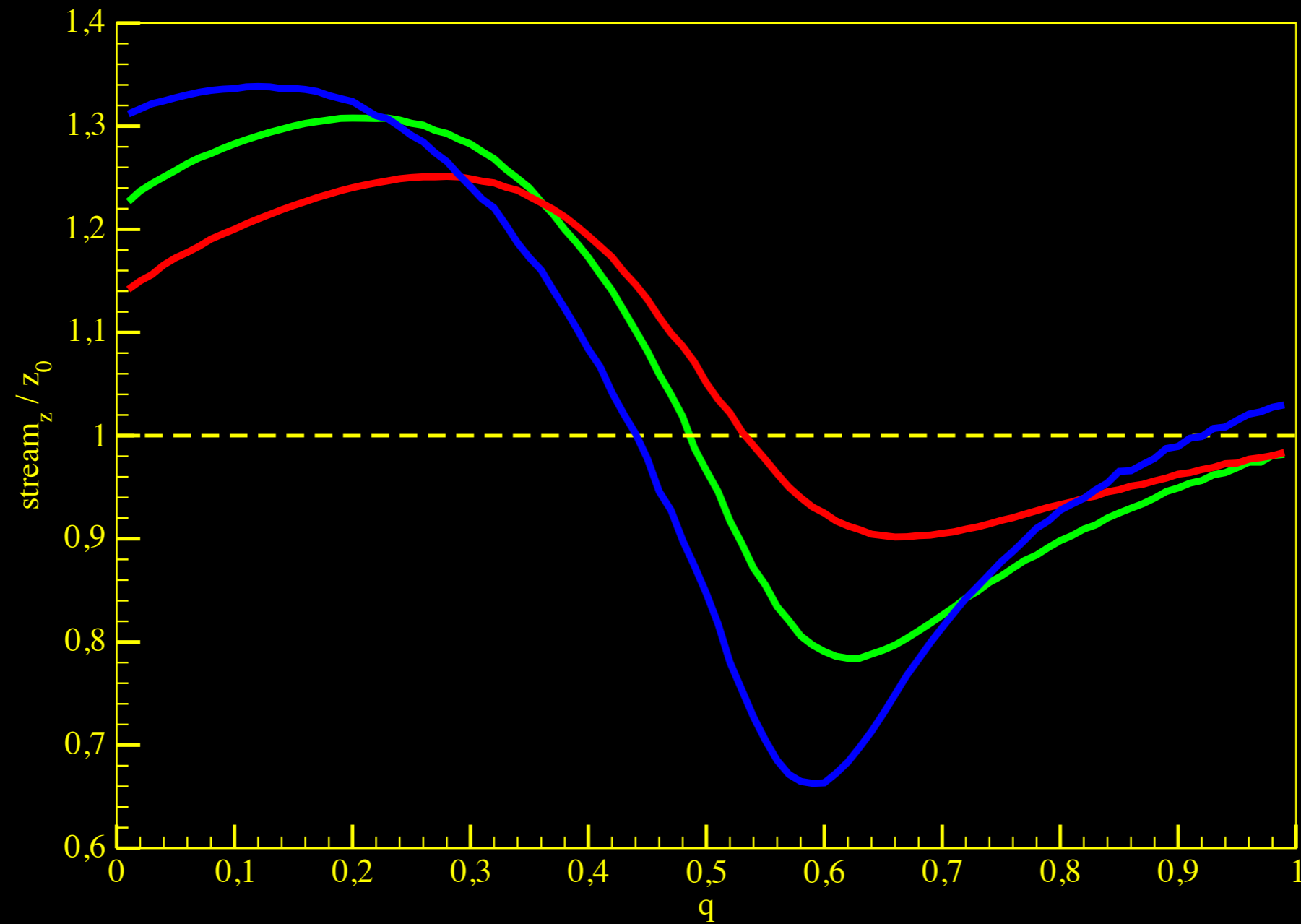
Disk height at stream collision point



$q=0.62$

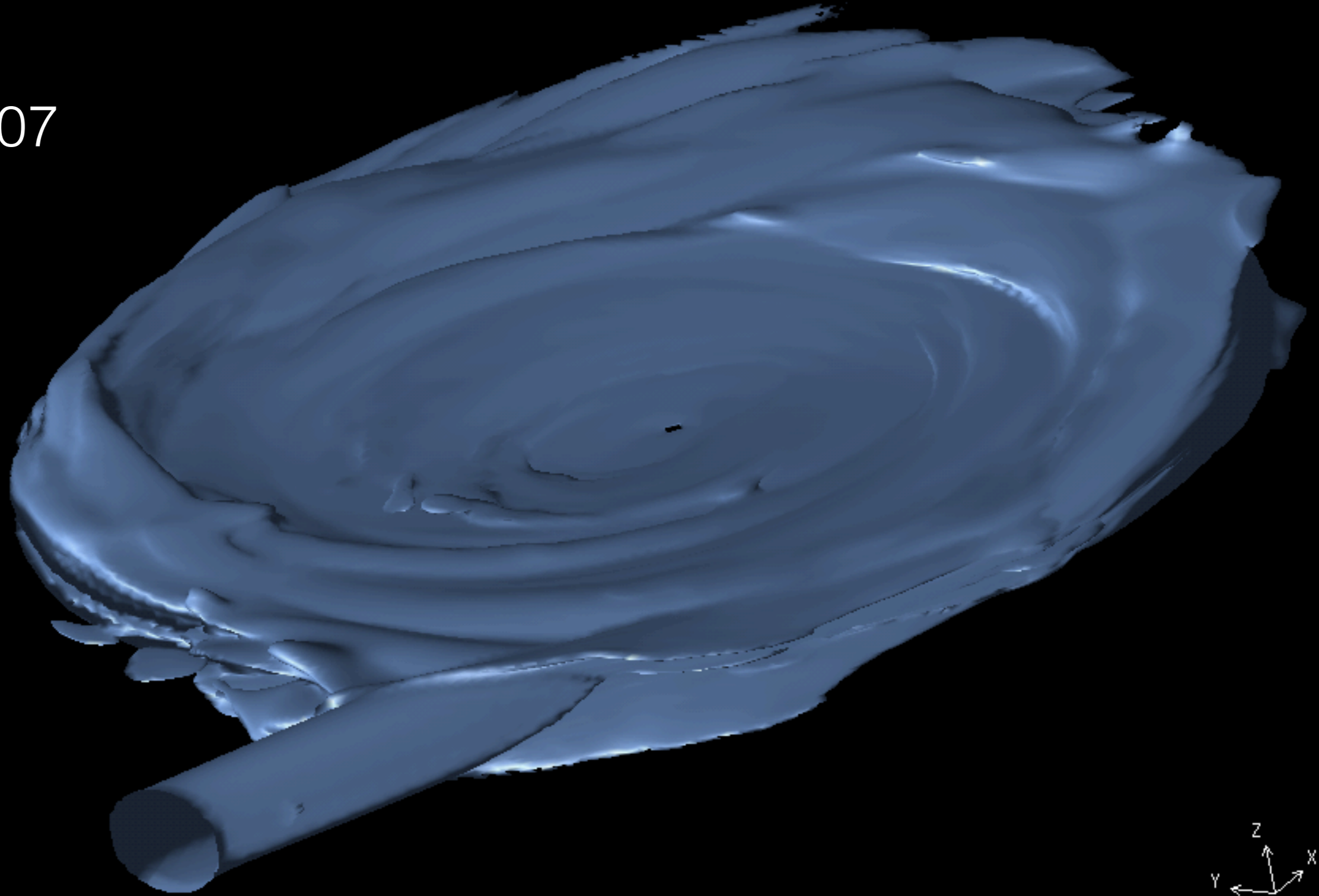


Disk height at stream collision point



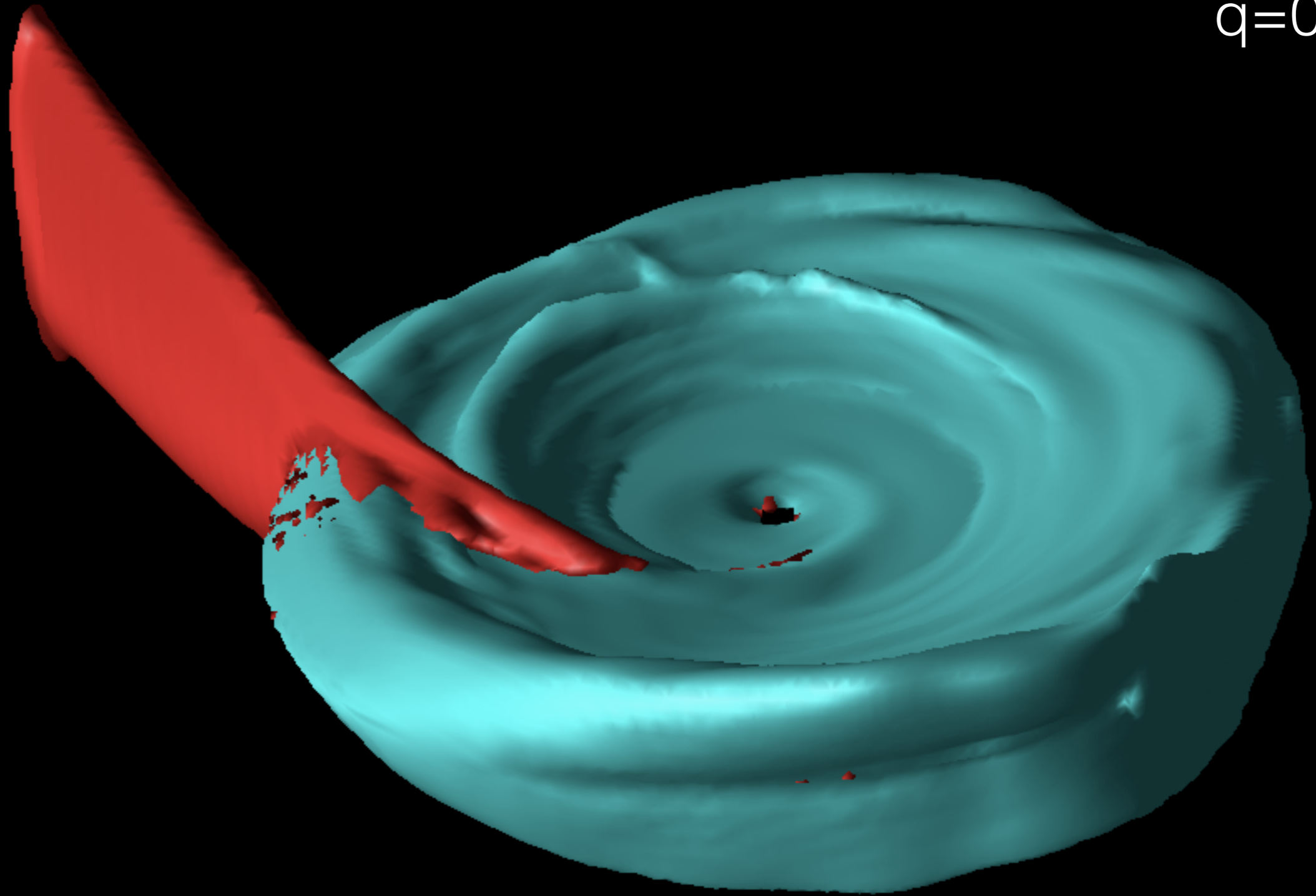
Stream-disk overflow

$q=0.07$

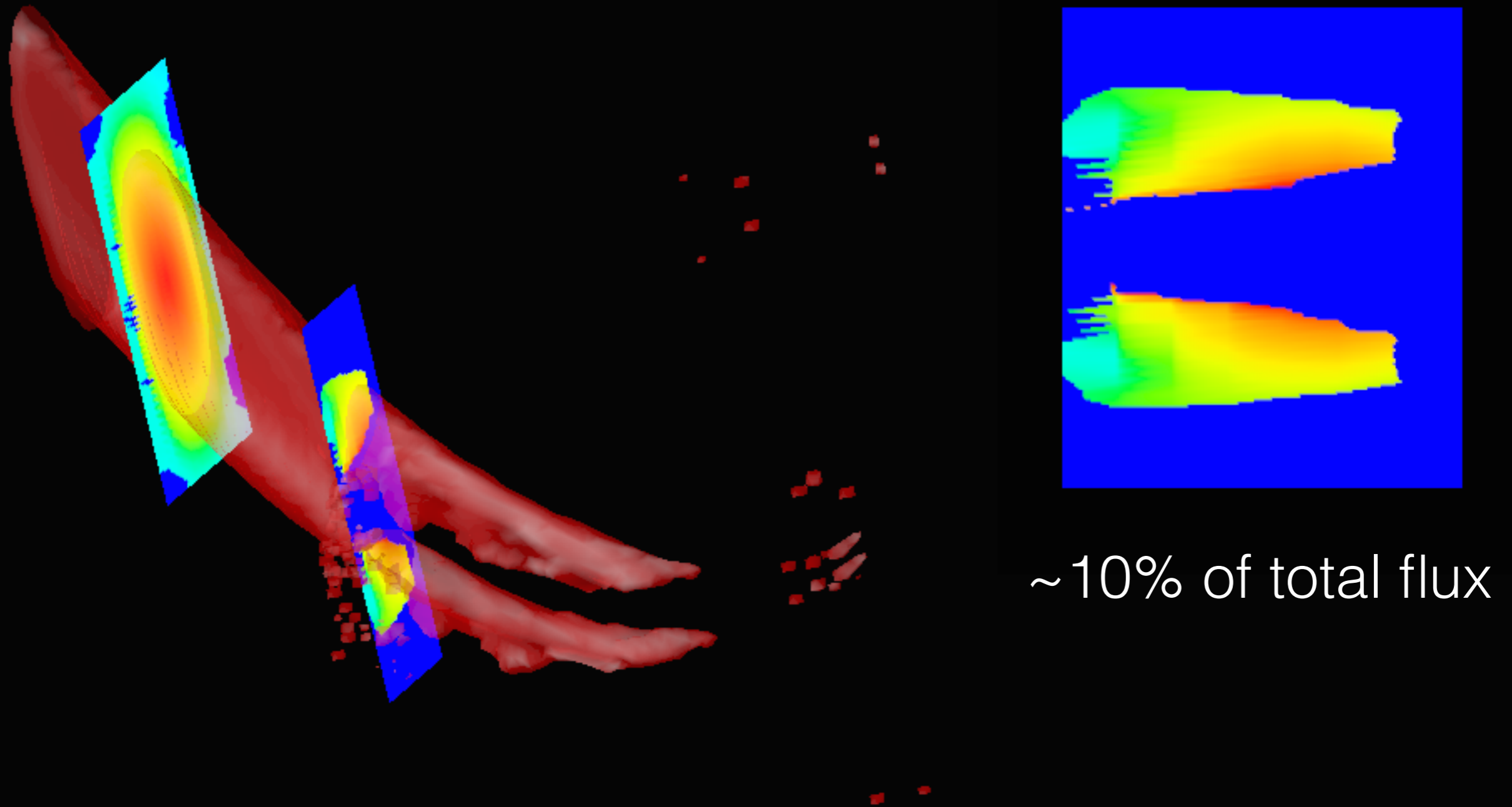


Stream-disk overflow

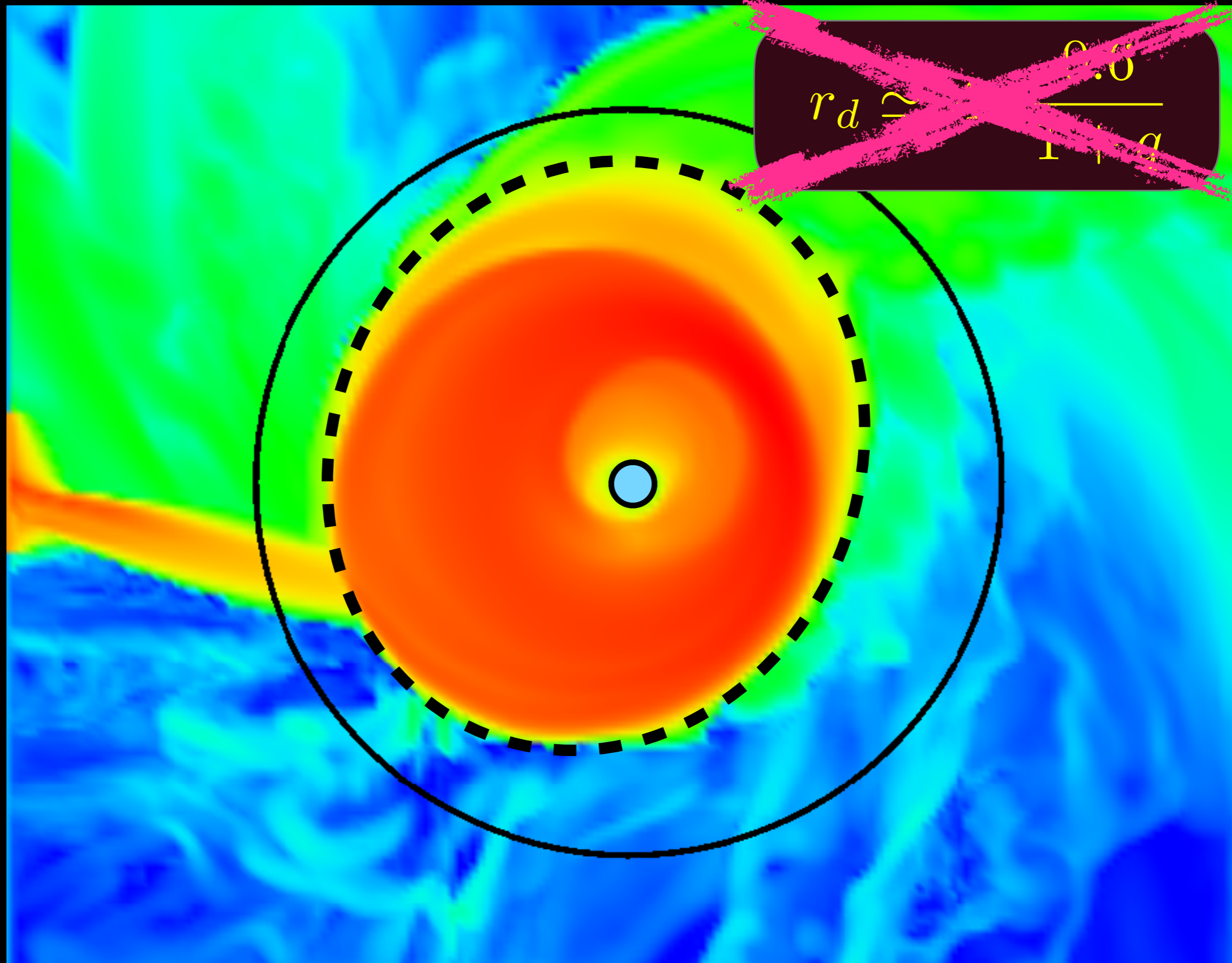
$q=0.6$



Stream-disk overflow

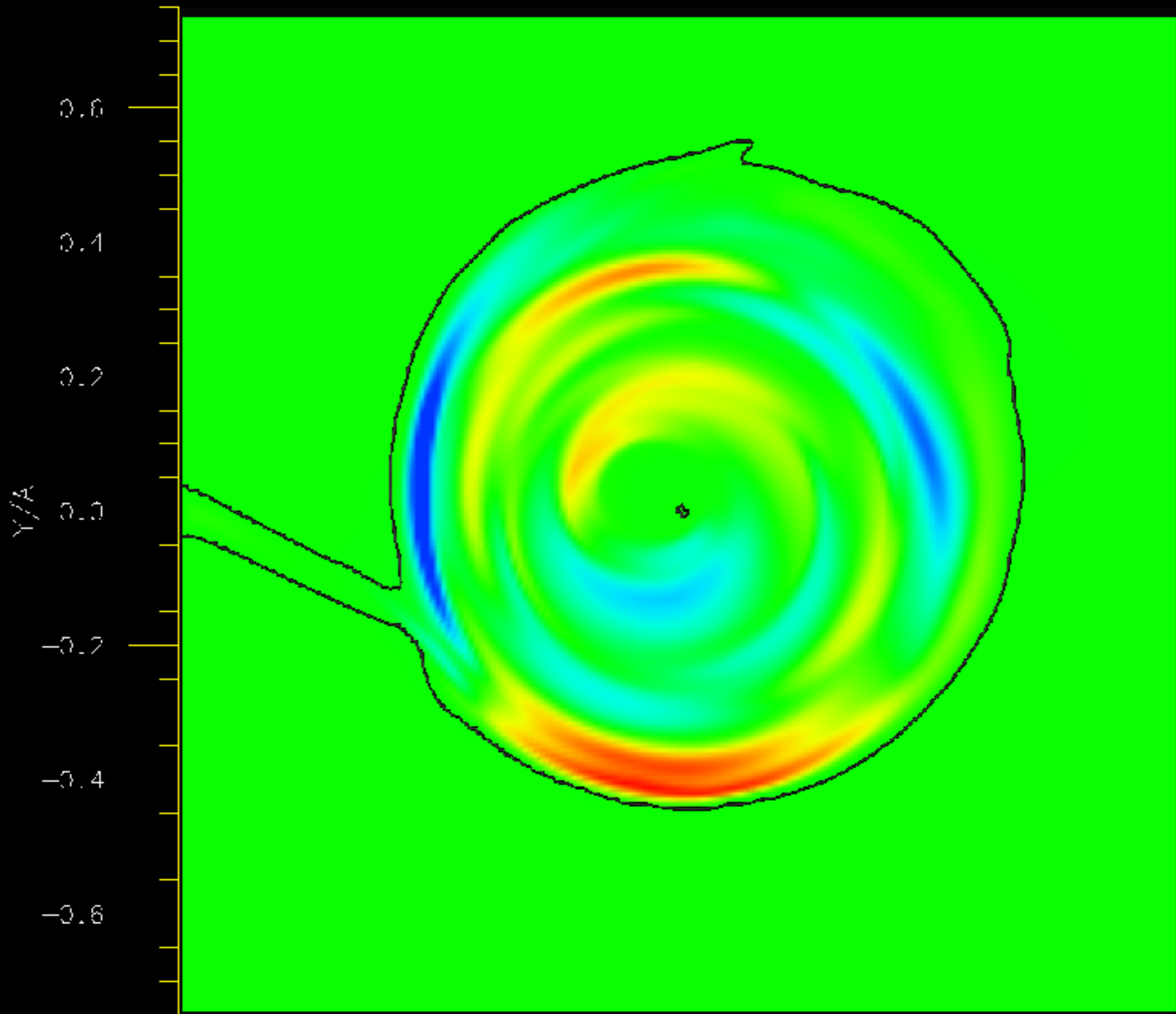


What can go wrong?

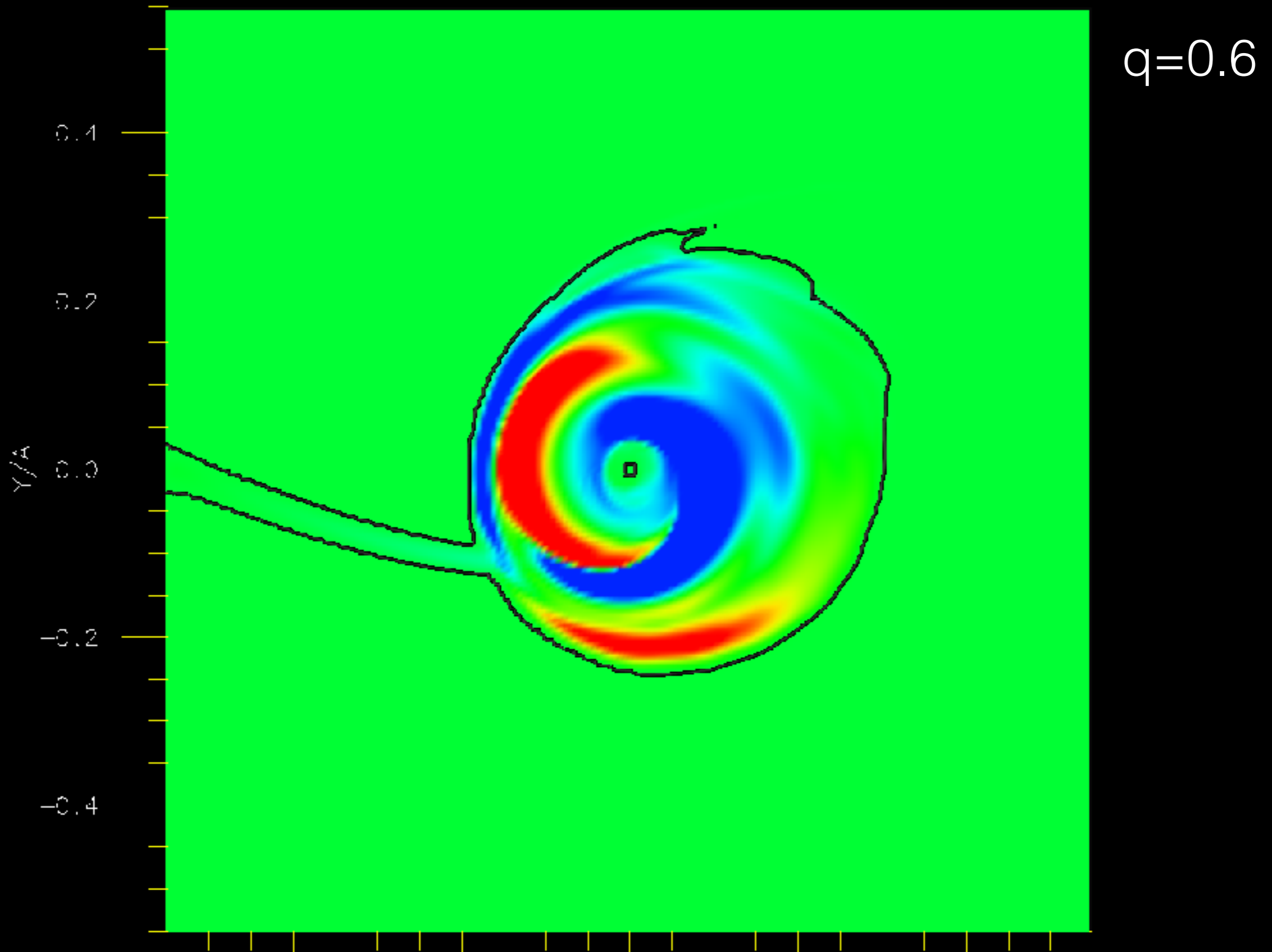


What can go wrong?

$q=0.07$



What can go wrong?



Conclusions

- Stream-disk interaction leading to formation of (typically) two humps and two deeps on the disk edge
- Phases of the humps and deeps are dependent from binary mass ratio
- Disk height on stream collision point is lower than equilibrium for $q > 0.5$, which can cause stream-disk overflow
- The model might need a calibration with observational data before we can use it for interpretations