Tidal disruption events induced by the Kozai-Lidov mechanism

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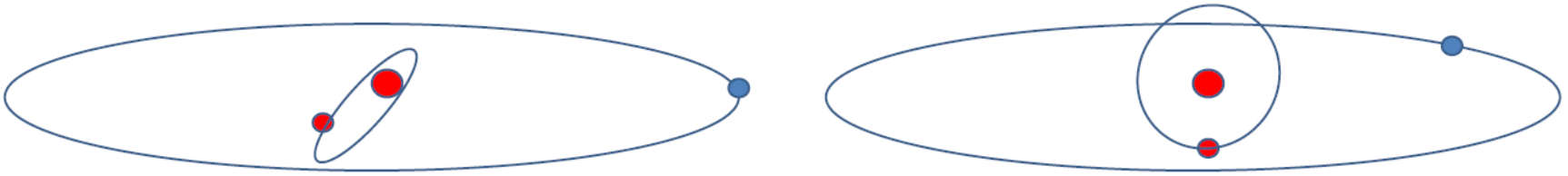
Poster #25

The Kozai-Lidov mechanism



Kozai mechanism works for hierarchical triple, and oscillations of inner eccentricity (e_1) and inclination.

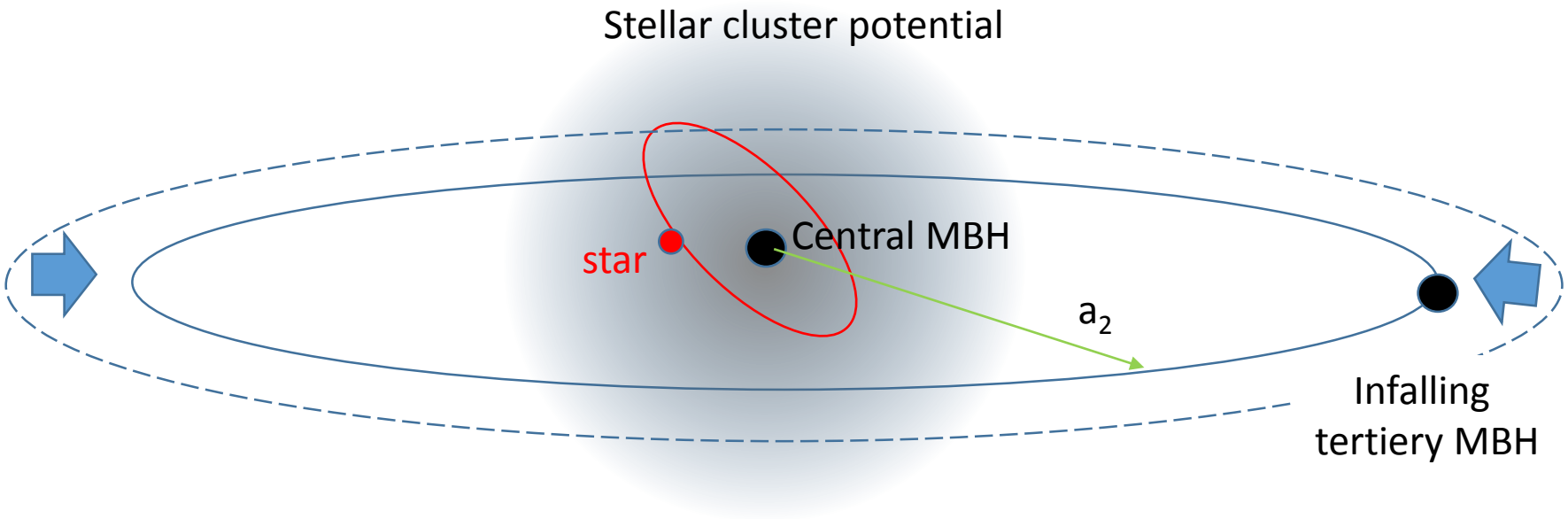
Characterized by a simple Hamiltonian H_0

$$H_0(G_1, \omega_1)$$

$G_1 \equiv \sqrt{1 - e_1^2}$

ω_1 Argument of pericenter

Evolution of KL by infalling tertiary

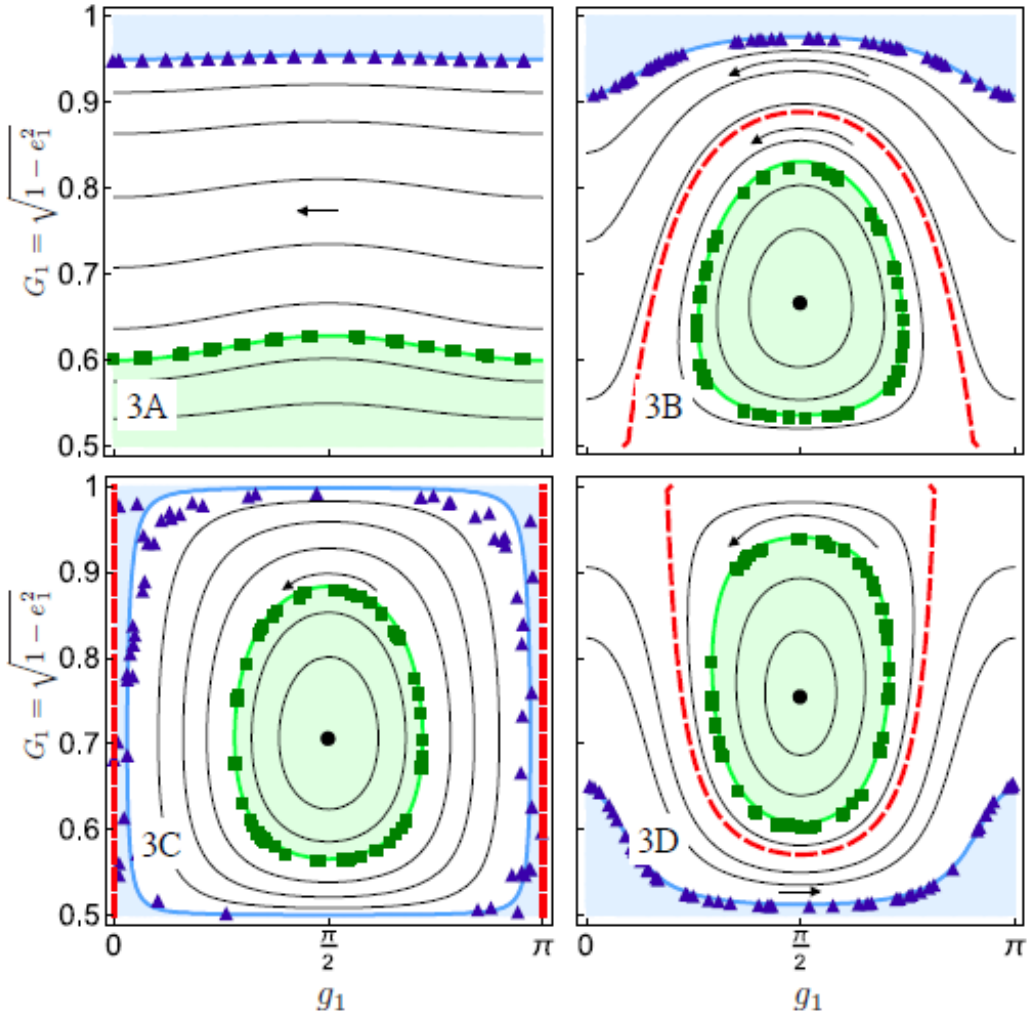


$$H_1(G_1, \omega_1; a_2)$$

External parameter (decreasing outer semimajor axis)

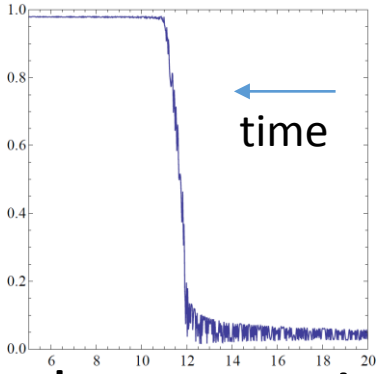
Geometrically analyzed evolution of inner orbits

1. How the phase space structure (e.g. fixed points) depends on a_2?
2. Adiabatic invariant (area conservation)



Interesting results for inner eccentricities

- Nearly circular orbit→ suddenly becomes highly eccentric (at separatrix crossing)



Inverted correspondence between initial and final eccentricities