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- ▶ Gravitational waves from extreme mass ratio inspirals.
  - ▶ Modeling gravitational waves emitted by a stellar compact object while it is moving in the background of a supermassive black hole.
- ▶ Hyperbolic gravitational interactions in two/three body systems.
  - ▶ Two body version: modeling the gravitational wave bursts during two body scattering process.
  - ▶ Three body system: testing numerically the stability of a binary system in close encounters with a third body.
- ▶ Canonical perturbation approach to a three body post-Newtonian Hamiltonian system.
  - ▶ An analytical Hamiltonian treatment in action-angle variables reducing a non-integrable system to an integrable one.
- ▶ Passage through resonances in non-integrable systems.
  - ▶ An analytical treatment to understand how resonances in Hamiltonian systems can be crossed when a weak dissipation is applied.