

Michela Mapelli

## Collisional dynamics in stellar systems

**LECTURE 1 (2h):** two-body relaxation timescale; collisional vs collisionless systems; summary of star cluster formation; distribution functions and equilibrium models

**LECTURE 2 (2h):** star evaporation; gravothermal collapse; mass segregation; Spitzer instability

**LECTURE 3 (2h):** stellar binary systems and three-body encounters

**LECTURE 4 (2h):** hot topics in collisional dynamics (intermediate-mass black holes, black hole ejection, dynamics of X-ray binaries, dynamics of gravitational wave sources)

**LECTURE 5 (2h):** hot topics in collisional dynamics (effect of metallicity on cluster evolution, formation of blue straggler stars, tools for simulating collisional systems, three-body encounters and planets, nuclear star cluster dynamics)

### Useful books:

- Binney J. & Tremaine S., 'Galactic Dynamics', 1987, Princeton University Press
- Spitzer L., 'Dynamical Evolution of Globular Clusters', 1987, Princeton University Press
- Course slides, online at <http://web.pd.astro.it/mapelli/lectures.html> by the end of the course

