

BLACK HOLES IN DENSE STAR CLUSTERS
Aspen Center for Physics
2015 Aspen Winter Conference January 17–22, 2015

POSTER TITLE: Influence of the Structural Properties of Star Clusters on the Formation and Evolution of Black Hole Binaries

PRESENTER: Brunetto Marco Ziosi & Michela Mapelli (INAF)

We study the formation and dynamical evolution of black hole-black hole (BH-BH) binaries in young star clusters (YSCs), by means of N-body simulations. The simulations include metallicity-dependent recipes for stellar evolution and stellar winds. Following recent theoretical models of wind mass-loss and core-collapse supernovae, we assume that the mass of the stellar remnants depends on the metallicity of the progenitor stars. We investigate the impact of several YSC properties on the formation of BH-BH binaries. In particular, we focus on YSC density, concentration and binary fraction. Our preliminary results indicate that BH-BH binaries form efficiently because of dynamical exchanges, especially in the denser YSCs. On the other hand, most of the dynamically formed BH-BH binaries are loose systems (semi-major axis $\gg 1$ AU), and cannot be observed by ground-based gravitational-wave interferometers.