Poster Session #D
Binary sources of Gravitational Waves and cosmology

D02

Probing SMBH with LISA

Srija Chakraborty (Scuola Normale Superiore Pisa)

We study hydrodynamical simulations of galaxy formation, based on the GADGET-3 code, and investigate supermassive black hole binaries coalescence at $5.5 < z < 14$ and the expected gravitational waves emitted from the binary mergers for different AGN feedback models. A fraction of the accreted rest-mass energy is radiated away by each BH. Furthermore, a fraction of this radiated energy is coupled to the surrounding gas as feedback energy. We consider the cases of thermal feedback, kinetic feedback,which includes AGNcone and AGNsphere,where in the former case the kinetic BH feedback is distributed inside bi-cone (45°half opening angle) and in latter the kinetic feedback is distributed in spherical geometry(90°half opening angle). We further consider the case in which no AGN feedback is implemented in the simulation. We find the merger rates for the kinetic feedback for two cases of AGNsphere and cone and for the thermal feedback two cases of no AGN feedback and with thermal AGN feedback. We stress the comparisons to be made between simulations of the same resolution: kinetic with smoothing length, R_{smooth}= 1ckpc/h and thermal with smoothing length, R_{smooth}=0.5 ckpc/h. For each model, we estimate the expected characteristic strain of gravitational waves emitted by supermassive black hole binary mergers, the time to coalesce, and the expected number of resolved events and compare our predictions with the LISA sensitivity and resolution. We further investigate the host galaxy properties for the events detectable by LISA and make predictions of the electromagnetic counter parts expected events to be detected by various electromagnetic facilities and present a panoramic view of merger events through different detectors.