The Formation of Supermassive Black Hole Binaries in Galaxy Mergers

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Supermassive Black Holes(SMBHs) are commonly found to reside in the center of most galaxies, and are generally considered to be one of the essential component of them. Using the mass relation between SMBH, stellar mass, and dark halo based on both theoretical works and observations in the literatures, we've built up more realistic galaxy models for N-body simulations to investigate the formation of the supermassive black hole binaries(SMBHBs) during galaxy mergers. The formation timescales as well as the orbital evolutions for different impact parameters and different mass ratios will be shown, also the density evolution around the SMBHs in the merged galaxy will be discussed. SMBHBs are one of the main sources of low frequency gravitational waves, which can only be detected by space-borne detectors such as the future LISA project or through pulsar timing arrays(PTAs). Knowing more about the host galaxy properties could be helpful towards pointing out potential sources for future observations.