Friday, April 13, 2018
4:10 – 5:00 PM
Barnard Hall (EPS) 103

Modeling the gravitational-wave and electromagnetic signatures of massive black hole binaries

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Abstract:

The coming years hold great promise for gravitational (GW) detections of black hole binaries across the mass scale, including supermassive black hole (BH) inspiral and merger. Pulsar timing experiments should soon detect GW signatures from the most massive BH binaries, and the advent of a space-based interferometer (i.e., LISA) will reveal the origins and merger history of lower-mass BHs from the earliest epochs. I'll describe the latest theoretical predictions for these GW signatures, including recent results that utilize the Illustris cosmological hydrodynamic simulations to construct the most comprehensive SMBH binary inspiral models to date. These models predict that the stochastic GW background from SMBH binaries should be detected in less than 10-15 years for a wide range of assumptions, and that individual SMBH binaries are more likely to be detected with pulsar timing arrays than previously thought. I will also discuss models of the spin evolution of SMBH binaries, both due to gas accretion and relativistic precession, and the implications for BH kicks due to GW recoil. Finally, I will describe ongoing work to model and identify actively-accreting BHs in merging host galaxies, prior to the GW-dominated regime.

Host: Amy Reines

* Refreshments served in the Barnard (EPS) second floor atrium at 3:45 PM *