

EMISSION LINES AS A TOOL IN SEARCH FOR SUPERMASSIVE BLACK HOLE BINARIES AND RECOILING BLACK HOLES

Tamara Bogdanović

*Department of Astronomy, University of Maryland,
College Park, MD 20742, USA*

E-mail: tamarab@astro.umd.edu

Observational paucity of supermassive black hole binaries (SBHB) in centers of galaxies seems to suggest that black hole pairs, created as a natural product of galactic mergers, coalesce on time scales shorter than a Hubble time. More recently, numerical relativistic simulations showed that in certain cases emission of gravitational radiation during a black hole coalescence can produce a kick which can expel a remnant supermassive black hole (SBH) from the center of its host galaxy. Discovery of statistically significant sample of SBHB and recoiling SBH has important astrophysical implications for a range of questions, from understanding the demographics and role of SBH in hierarchical structure formation to their cosmological spin evolution. I will review the observational signatures that are expected to accompany SBHB and runaway black holes along with some of the challenges associated with their modeling. Finally, I will talk about the existing observational evidence for recoiling SBH and SBHB candidates, and comment on models that attempt to explain unusual optical emission-line spectra of these objects.