

Supermassive Black Hole and Exotic Physics In the Galactic Nuclei of Nearby Galaxies

Supermassive black holes (SMBHs) may spend the majority of their lives accreting at low rates through radiatively inefficient, advection-dominated accretion flow. Therefore, low-luminosity SMBHs could greatly outnumber their more active cousins, active galactic nuclei, thus are essential for our understanding of SMBH activity cycles and their relationship to galaxy evolution. In particular, SMBHs harbored in local galaxies are found to be remarkably under-luminous. The best studied under-luminous SMBH is the closest such object to Earth, Sagittarius A*, located in the nucleus of our Milky Way galaxy. In this talk, I will discuss how we have been probing the outburst history of Sagittarius A* and how I plan to apply these techniques to SMBHs in nearby galaxies such as Andromeda. The Galactic nucleus of the Milky Way galaxy also serves as an ideal lab to probe exotic physics. I would like to introduce a new research direction of mine, to probe Galactic cosmic-rays at MeV through PeV energy scales. This project aims to eventually answer the question whether Galactic cosmic-rays are from ordinary astrophysical sources or of more exotic origin.



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3:30 - 4:30 p.m.

725 Commonwealth Ave | Room 500

Shuo Zhang

Boston University