

# Saitama University Astrophysics Seminar

The Zoo of Compact Objects and X-ray Binaries in the Center of the Milky Way

Date: 2025/3/31 Mon. 16:00-17:00

Venue: Room 2, Lecture and Experiment Building, Faculty of Science

Speaker: Kaya Mori (Columbia University, NY, USA)

**Abstract:** The Galactic Center (GC) is home to the highest concentration of X-ray sources ever identified in our Galaxy, including black holes, neutron stars, white dwarfs, and their binary systems. Given the long distance of 8 kpc and substantial dust extinction, these objects, whether in quiescent or outbursting states, are best studied by X-ray telescopes with high angular resolutions and sensitivities. Combined with dedicated infrared observations of the GC region, we can conduct the most comprehensive exploration of compact object populations near Sgr A\*, the nuclear star cluster/disk, the central molecular zone, and beyond. These X-ray source population studies will test fundamental theories of binary formation and evolution around Sgr A\* and other galactic nuclei. This presentation will review the last two decades of X-ray observations of the GC region by Chandra, XMM-Newton, NuSTAR, Swift, and Suzaku. For instance, Chandra has detected over 10,000 X-ray point sources in the central few degrees, predominantly comprising cataclysmic variables (CVs) and low-mass X-ray binaries (LMXBs). I will present our investigations into X-ray source populations in the GC, highlighting our Chandra analysis of quiescent X-ray sources in the central parsec, hard X-ray sources detected by NuSTAR, high-mass X-ray binary (HMXB) searches, and extensive XMM-Newton and Chandra observation campaigns of the inner Galactic disk. Furthermore, the high density of X-ray binaries makes the GC a rich environment for detecting and identifying new X-ray transients within the central  $\sim 50$  parsecs, as evidenced by about a dozen X-ray outbursts detected over the last two decades. After discussing broadband X-ray observations of GC transients, I will present historic coordinated X-ray observations of a newly discovered transient, MAXI J1744-294, located just a parsec from Sgr A\*, conducted by nearly all currently operating X-ray telescopes, including XRISM.

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