

第105回 (2025年度第4回) 極限宇宙研究拠点セミナー (the 4th Core-U Seminar in FY2025)

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Title

**Making the invisible visible, X-ray polarization
constraining magnetic fields in black hole accretion flows**

Abstract

Black hole X-ray binaries are powered by the accretion of matter, transforming the potential gravitational energy into radiation. During their outbursts, they can emit strong X-ray radiation and powerful relativistic jets. The advent of X-ray polarization, marked by the launch of IXPE in 2021, has redefined the X-ray astronomy field. IXPE has yielded significant insights into the structure and geometry of black hole accretion flows. However, not all avenue of research have been explored yet. Faraday rotation is a natural occurrence that is expected when polarized waves traverse a dense and magnetized region.

In this presentation, I will start by making an introduction about X-ray binaries, their behavior and our general understanding. Then I will show why Faraday rotation can not be neglected for X-ray photons escaping a stellar mass black hole's magnetized accretion flow. I will discuss the effects of Faraday rotation on the unresolved photon beam observed by IXPE and highlight how the absence of any observational evidence of this phenomenon provides the first observational upper limit on the magnetic field strength and structure within a stellar mass black hole's accretion flow, making the invisible visible.

本セミナーは共同セミナー（理工学融合共同演習）の対象です。共同セミナーの出欠確認は対面参加者のみとし、出欠はセミナー終了時にE208で取ります。サインを記入する書類を持参して下さい。

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