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X-ray obscurers: bridging the gap between warm absorbers and ultra-fast outflows

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Outflows from active galactic nuclei are found over a broad range of distances from the supermassive black hole and with a large range of velocities. The so-called “warm absorbers” cover a broad range of ionization parameters but at modest velocities of a few hundred to thousand km/s and relatively modest column densities of typically less than 1% of the Thomson depth. On the other extreme, ultra-fast outflows with speeds of order $0.1c$ have column densities up to a Thomson depth but are almost fully ionized. In this contribution, we discuss a newly discovered component, the X-ray obscurers which occupy the velocity gap and likely also the distance gap between warm absorbers and ultra-fast outflows. These obscurers have been studied in detail using deep joint monitoring observations with XMM-Newton, HST, Swift and NuSTAR in for example NGC 5548 and NGC 3783. The gas is generally lowly ionized, has high column densities up to 10% of the Thomson depth and is outflowing at speeds of several thousands of km/s. They block a significant fraction of the ionizing radiation from the central regions, are likely due to a strong accretion disk wind, and occur more frequently than previously anticipated. We discuss the impact of these obscurers on their environment, their frequency and the observational challenges to study them.

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

Affiliation

SRON

Primary authors: KAASTRA, Jelle (SRON); Prof. BEHAR, Ehud; Prof. BIANCHI, Stefano (Università degli Studi Roma Tre); Prof. BRANDUARDI-RAYMONT, Graziella; CAPPI, Massimo (Istituto Nazionale di Astrofisica (INAF)); COSTANTINI, Elisa (SRON, Netherlands Institute for Space Research); Dr DE MARCO, Barbara (Nicolaus Copernicus Astronomical Center PAS); Dr DI GESU, Laura; Dr EBRERO, Jacobo; Dr KRISS, Gerard; Dr MAO, Junjie; Dr MEHDIPOUR, Missagh; Dr PERETZ, Uria; Dr PETRUCCI, Pierre-Olivier; Dr PONTI, Gabriele; Dr WALTON, Dom

Presenter: KAASTRA, Jelle (SRON)

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