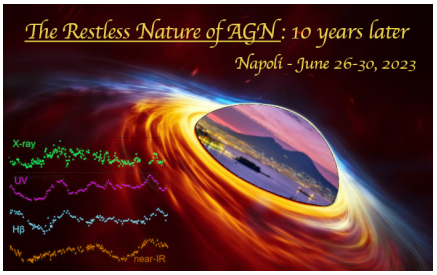

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eROSITA Detection of Cloud Occultation Events in Seyfert AGN, and Contributions for Clumpy-Torus models

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Recent years have seen broad observational support for the circumnuclear gas around supermassive black holes to contain a clumpy component. In the X-ray band, individual clouds can manifest themselves when they transit the line of sight to the X-ray corona, temporarily obscuring the X-ray continuum, and indicating the characteristics and location of these clouds.

The eROSITA X-ray telescope aboard Spectrum X/Gamma is performing multiple all-sky X-ray surveys, including monitoring a vast sample of AGN and galaxies. Such monitoring can amplify rare cloud occultation events, allowing us to accumulate observational constraints for clumpy-torus models, including cloud distribution and composition parameters.

Here, we discuss the first cloud occultation events detected in a Seyfert 1 galaxy by eROSITA: in this Seyfert, the soft X-ray flux dipped abruptly for $\sim$ 10-18 months during 2020-2021, recovered, but then dropped a second time by Spring 2022. Our two-year multi-wavelength follow-up campaign included X-ray/UV and ground-based optical photometric and spectroscopic observations, and confirmed that the soft X-ray flux dips were caused by partial-covering obscuration by two separate, single compact clouds near the black hole. The two transiting clouds are consistent with neutral or lowly-ionized gas, residing at radial distances commensurate with the optical Broad Line Region and the inner dusty torus, respectively.

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