

The restless nature of AGN: 10 years later



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Continuous X-ray monitoring of the south ecliptic pole with eROSITA

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The eROSITA all-sky surveys (eRASS) continuously scan the sky along great circles crossing the ecliptic poles. This scanning strategy covers the full sky every six months and visits the ecliptic poles every four hours, leading to much longer exposure time and much higher cadence at the ecliptic poles than the majority of the sky. Between Dec. 2019 and Feb. 2022, the eRASS surveys scanned the full sky more than four times and observed the ecliptic poles more than 4600 times, with a total exposure of more than 160ks at the ecliptic poles. Because of the long exposure near the confusion limit of eROSITA, we treated the region within 3 degrees of the south ecliptic pole (SEP) separately from the main part of the eRASS surveys and detected X-ray sources with a pipeline fine-tuned for such crowded fields. We built a catalog with $\sim 15k$ X-ray sources within 3 degrees of SEP ($\sim 8k$ within 1 degree) and identified their multiband counterparts from a few catalogs including CatWISE, NSC-DR2, S-CVZ, and GAIA-DR3. Based on multiband colors, we selected AGN from them and used the AAOmega spectrograph onboard the AAT telescope to follow them up. A large number of the X-ray sources exhibit significant variability, including a few particular targets that are possibly tidal disruption events, AGN shutting down or ignition events, or quasi-periodic oscillation cases. We study the normalized excess variance and power spectral densities of AGN with X-ray light curves, measure their optical properties, e.g., black hole mass, using optical spectra, and analyze the correlation between them.

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