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Multi-wavelength study of extragalactic transients detected with eROSITA: A flaring event in an AGN

Several studies of actively accreting supermassive black holes have revealed that large amplitude variability often triggers significant spectral changes; a phenomenon known as changing look AGN (CLAGN). eROSITA through its successive all sky surveys, has made the detection of the sources using the X-ray band much more systematic. In 2020, eROSITA along with the Zwicky Transient Facility (ZTF) detected a flaring event in a type-1.9 AGN, where a sharp change of ~ 0.55 and ~ 0.3 in g- and r-band magnitudes was seen in ~ 81 days. We performed an extensive multiband follow-up campaign on the object for two years. Immediate optical follow-up using the Keck telescope revealed the appearance of a double-peaked $H\beta$ emission line (previously absent in a 2005 6dF archival spectrum) and a bluer continuum compared to 2005, confirming a CLAGN event. The X-ray light curve exhibits an extreme flux variation. The X-ray spectral photon index is typical for AGN accretion. The long-term X-ray and optical light curves reveal a weaker second flare during early 2020. More optical spectroscopic follow-up shows that integrated flux of the Broad emission lines of $H\beta$ and $H\alpha$ tracks the X-ray–UV–Optical continuum. The infrared emission also responds to the transient variability. This transient event with multiwavelength signature is a sudden, temporary rise in accretion rate over a persistent, low accretion flow, e.g., speculatively caused by an accretion disk instability.

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