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"Improving transient identification with Swift-XRT"

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The Living Swift-XRT Point Source Catalogue (LSXPS) is a unique facility: it is updated in near real-time, enabling a sensitive, "live" search for new high-energy transients. This opens up a new area of transient phase-space for exploration, as evidenced by the LSXPS discovery of the enigmatic event Swift J0230. However, the majority of transient candidates detected are faint, classified as "low significance" transients within LSXPS; determining which of these are actually transient, especially where they are close to the XRT detection limit and consequently impacted by the Eddington bias, poses a significant challenge. We present a simulation-based approach which yields confidence intervals on source flux, corrected for the Eddington bias and accounting for the increasing number-density of sources at lower fluxes. This enables more reliable identification of true transients and rejection of those whose apparently increased flux is a measurement effect. Currently, LSXPS has detected approximately 8000 transients, with about 2400 classified as low significance . Improving the categorization of even 10% of these detections could significantly enhance the catalog's quality and reliability. This technique will shortly be incorporated into the real-time LSXPS analysis and we discuss the expected impact on transient detection rates and the potential impact on high-energy transient astronomy in the TDAMM era.

Primary authors: Dr EVANS, Phil (University of Leicester);   SRIVASTAVA, Srijan (University of Leicester, UK)

Presenter: SRIVASTAVA, Srijan (University of Leicester, UK)

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