High Energy Astrophysics and Cosmology in the era of all-sky surveys

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## Machine learning models for SRG/eRosita extragalactic sky: challenges, results and perspectives.

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During the 2.5 years in 2019-2022 the eROSITA telescope onboard the SRG space observatory produced a deep all-sky survey in soft X-rays. The competitive analysis of this unique data requires: firstly, massive usage of publicly available sky surveys (photometric, spectroscopic, astrometric) in the broad spectral range from Radio to UV; secondly - intensive application of modern machine learning techniques, such as - Gradient Boosting and Random Forest quantile regression and classifiers, t-distributed Stochastic Neighbor Embedding, Density-Based Spatial Clustering of Applications with Noise, and other techniques suitable for tabular data of astronomical catalogs.

I will review the current status and main results achieved so far with SRGz system for analysis of eRosita X-ray data in the Eastern Galactic Hemisphere. SRGz contains machine learning methods adopted for X-ray astrophysics tasks, such as, X-ray object optical/IR match, object physical classification and photometric red-shift measurement. I will discuss identification of distant and luminous X-ray quasars at z>5 and photometric prediction of BPT-class and optical spectral lines properties for X-ray objects at z<0.4.

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