

Application of the machine learning methods to search for exocomet transits in the TESS data base (No 1917)

ePoster

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In this report, we discuss the current state of problems associated with the discovery and study of exocomets, i.e., objects of extrasolar systems, that are in many aspects similar to the comets of our Solar system. Currently, the Kepler and TESS space mission databases confine most of the stars with the confirmed exoplanetary systems. High quality lightcurves, which have been collected during these space missions, potentially make it possible to identify quite small changes in the star brightness caused by the passage of a comet-like body over the star disk. Given the vast data sets and the very weak manifestation of this physical phenomenon, special methods of the data processing and analysis of the brightness curve shapes should be developed to solve the problem. We report preliminary results of lightcurve processing aiming at identification of the minima in the star brightness based on the TESS pipeline as well as application of the deep learning methods for the morphological classification of the brightness minima to discriminate two different phenomena – exoplanet and exocomet transits. To train the model, we use the two different samples: the lightcurve profiles caused by the identified exoplanet transits from the TESS data base and the simulated brightness profiles due to an exocomet transit. The latter are calculated using the Monte-Carlo approach to form the exocomet dusty tail taking into account orbital characteristics of the transiting body and some physical properties of particles populated its dusty atmosphere.