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Multi-class classification of unassociated Fermi LAT sources with machine learning and dataset shifts

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About one third of Fermi-LAT sources are unassociated. In this talk, I will present recent developments in the multi-class classification of Fermi-LAT sources using machine learning with the goal of probabilistic classification of the unassociated sources. A particular attention will be paid to the fact that the distributions of associated and unassociated sources are different as a function of most source parameters, such as the spectral index, spectral curvature, galactic latitude, flux, or variability. On the one hand, such differences can be caused by association bias as it is typically easier to determine associations for bright high-latitude sources with hard spectra. Alternatively, these differences may hint at a possible existence of a new class of gamma-ray sources. We will discuss this problem in the framework of dataset shifts in machine learning.

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Session Classification: Searches for Extragalactic astrophysical sources