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Multi-class classification of gamma-ray sources and the nature of excess of GeV gamma rays near the Galactic center

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Catalogs of sources have many sources with unknown physical nature. In particular, Fermi-LAT catalogs of gamma-ray sources have about one third of sources with unknown multi-wavelength counterparts. Some of the gamma-ray sources may be visible only in gamma rays, such as distant pulsars with radio jets not pointing at the observer. Machine learning algorithms provide a tool to perform a probabilistic classification of unassociated sources, which can provide information about their nature. In particular, such probabilistic classification of sources can be used for population studies of sources including not only associated but also unassociated sources. In this presentation we will illustrate the application of probabilistic classification of sources for the problem of understanding the excess of GeV gamma rays near the center of the Milky way galaxy.

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