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## Searches for exotic objects among Fermi-LAT gamma-ray sources with weakly supervised machine learning

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Weakly supervised machine learning has emerged as a powerful tool in particle physics, enabling the classification of data without relying on extensive labeled examples. This approach holds immense potential for the identification of exotic objects in the gamma-ray sky, particularly those arising from dark matter annihilation. In this contribution, we present our methodology for exploring this potential using the most recent catalog of gamma-ray sources observed by the Fermi-Large Area Telescope. We compare supervised and unsupervised classification techniques to analyze the gamma-ray spectra of sources, aiming to identify objects of unknown astrophysical origin without prior knowledge of their nature. By employing weakly supervised learning, we seek to generalize towards more model-independent searches for exotic sources. Our results demonstrate the effectiveness of both supervised and unsupervised approaches in identifying dark-matter-like objects, while also highlighting limitations on less well-defined problems. This work paves the way for the systematic use of weakly supervised machine learning in the quest for new physics beyond the Standard Model using gammaray sources.

Primary author: NIPPEL, Kathrin (RWTH Aachen University)
Co-authors: Prof. KRÄMER, Michael (RWTH Aachen University); Dr MANCONI, Silvia (LAPTh)
Presenter: NIPPEL, Kathrin (RWTH Aachen University)
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