



Contribution ID: 93

Type: **Talk without Poster**

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

Wednesday, 1 May 2024 16:32 (20 minutes)

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 gamma-ray 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)

Session Classification: 4.4 Explainable AI