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Machine Learning for Energy Reconstruction in ATLAS Calorimeters

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A crucial task of the ATLAS calorimeter is energy measurement of detected particles. In the liquid argon (LAr) calorimeter subdetector of ATLAS, electromagnetically and hadronically interacting particles are detected through LAr ionization. Special electronics convert drifting electrons into a measurable current. The analytical technique presently used to extract energy from the measured current is known as optimal filtering. While this technique is sufficient for contemporary pile-up conditions in the LHC, it has been shown to suffer some degradation of performance with the increased luminosity expected at the High Luminosity LHC. This presentation will explore machine learning techniques as a substitute for optimal filtering, examining the strengths, weaknesses, and limitations of both energy reconstruction methods.

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Experiment

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