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Type: **Short talk (15min. + 5 min. Q/A)**

Real-time Anomaly Detection in Liquid Argon Time Projection Chamber

Friday 31 October 2025 09:20 (15 minutes)

Real-time anomaly detection provides a model-independent way to search for unexpected phenomena, complementing traditional model-driven triggers. At the LHC, autoencoder-based anomaly triggers in CMS such as CICADA (on raw calorimeter data) and AXOL1TL (on reconstructed objects) have already demonstrated the power of these methods, with similar efforts underway in ATLAS through GELATO. Motivated by these successes, we investigate the application of such techniques to Liquid Argon Time Projection Chambers (LArTPCs), where raw wire data directly capture ionization energy depositions. I will present results on the physics performance of autoencoder-based anomaly detection networks for LArTPCs, along with initial benchmarking studies toward hardware acceleration on FPGAs and CPUs.

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Session Classification: AI/ML for New Physics Search