

Trigger-level analysis in ATLAS

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Traditional decision-making processes require that data is collected first, then analyzed. This model is not sustainable when the quantity of data is too large to be recorded for subsequent analysis. The Large Hadron Collider at CERN collides protons up to 30 million times per second: the majority of these events need to be rejected to comply with data processing and storage constraints. While this strategy works for many physics searches (e.g. Higgs, leptonic processes), it misses key classes of events where the signal is buried in irreducible backgrounds. This is why the Trigger Level Analysis technique has been introduced in the ATLAS experiment: the analysis is done in real-time within the decision-making system, allowing to record orders of magnitude more events that can be used e.g. for dark matter searches. All this data also needs to be analysed after being recorded, and a key component of the Trigger Level Analysis is the statistical analysis procedure in presence of an unprecedented number of data events to analyse. This flash talk will focus on the statistical analysis strategies employed by the analysis to identify minuscule signals on top of enormous backgrounds.

Abstract Track

Flash talk, LHC

Authors: MARCON, Caterina (Lund University (SE)); DOGLIONI, Caterina (Lund University (SE)); SMIRNOVA, Oxana (Lund University (SE))

Presenter: MARCON, Caterina (Lund University (SE))

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