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A Model Independent General Search for New Physics in ATLAS

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The start of the Large Hadron Collider in 2009 has opened a new window for high energy physics. It is expected to provide answers to some of the long-standing questions in particle physics; namely the details of the electroweak symmetry breaking mechanism in the Standard Model, and the possibility of new and exotic physics at the TeV-scale.

In this talk preliminary results of a novel model independent general search for new physics with the ATLAS detector are presented.

In contrast to specific “model-driven” searches this analysis follows an orthogonal approach. Instead of concentrating on a specific sub-model of new physics, the ATLAS data is systematically searched for deviations from the Standard Model predictions with a model-independent approach; with the only assumption that new physics will appear in high transverse momentum events.

Events containing leptons (μ , e), jets and missing transverse energy, $E_{T\text{miss}}$, are considered and subdivided into exclusive classes according to their final states. At this point a merging algorithm is employed to reduce the potentially infinite number of classes to a finite number without losing discovery potential.

As a second step in each class a search algorithm is used to find the region in the M_{eff} distribution showing the largest discrepancy with the MC expectations; taking into account both statistical and systematic uncertainties. The significance for such a deviation to occur is then corrected for the trial factors, both for the individual channel and for all channels combined. Preliminary results over 2.052 fb^{-1} of 2011 data are reported with a good overall agreement observed in most of the event classes.

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