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A Signature of New Physics: Determining Missing Energy in the ATLAS Detector THOMAS SCHMIT, VIVEK JAIN[1], DARIA ZIEMINSKA[2], Indiana University — Missing energy is a major discriminant for new physics in high energy proton-proton collisions generated by the Large Hadron Collider at CERN. The ATLAS detector, which collects data at the LHC, has a very sophisticated calorimeter that measures the energy and position of particles and jets created in these collisions. A vector sum of the energy of these objects is performed over the entire detector; a non-zero value implies missing energy. When missing energy is large it indicates that a non-interacting particle may have passed through the detector. Accurate reconstruction of missing energy is necessary to identify new particles, such as candidates for dark matter, e.g., the Lightest Super-symmetric Particle. The focus of this survey was on the accuracy of missing energy reconstruction, specifically, on the role of muons that are created in the collisions.

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