Contribution ID: **150** Type: **parallel talk**

Measuring Particle Masses From Missing Energy Signatures without Using Missing Energy

Monday 7 May 2012 15:15 (15 minutes)

Abstract:

In this paper we elucidate how a new a geometric understanding of the correlations between invariants in four-body cascade decays can lead to experimentally viable methods for particle mass reconstructions. Four body cascade decays are prevalent in low mass supersymmetry models. However, experimentally feasible methods formeasuring particle masses within SUSY decay chains have historically been incumbered by the presence of a non-interacting lighest supersymmetric partner which manifests only as missing energy. The general framework we present here works independently of missing energy measurements as well as particle spins.

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Session Classification: SUSY I

Track Classification: Supersymmetry