

Addressing the “Inverse Problem” of Multichannel Particle Searches: A Model-independent Approach to Supersymmetry Search with Trileptons

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Using supersymmetry search with trileptons as an example, we address the problem of discerning new physics when it manifests itself in multiple channels simultaneously with several models vying to accommodate the findings. This is best achieved by presenting experimental results in a model-independent fashion, but suitably parametrized to allow for their interpretation in most models. The interpretation of recent supersymmetric trilepton searches at the hadron collider experiments has been restricted to the mSUGRA model. We show how to extend the trilepton results to other models by categorizing the experimental sensitivity by the τ lepton content of the signal and parametrizing it in terms of three key superparticle masses. We demonstrate our method by applying it to the recent Tevatron bounds and estimate the future Tevatron sensitivity in the trilepton channel. Further, we systematically identify the trilepton-rich sectors of the superpartner mass parameter space and also evaluate the τ -lepton flavor content of the signal.

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