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# Reconstructing CMSSM parameters at the LHC with s√=14 TeV via the golden decay channel

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We identify a benchmark point in the CMSSM's heavy stau-coannihilation region, which is favored by experiments, and demonstrate that it could be accessible to the LHC at s√=14 TeV with 300/fb of integrated luminosity via a golden decay measurement. With Monte-Carlo, we simulate sparticle production and subsequent golden decay at the event level and perform pseudo-measurements of sparticle masses from kinematic endpoints in invariant mass distributions. We find that two lightest neutralino masses and the first and second generation left-handed slepton and squark masses could be rather precisely measured with correlated uncertainties. We investigate whether from such measurements one could determine the CMSSM's Lagrangian parameters by including a likelihood from our pseudo-measurements of sparticle masses in a Bayesian analysis of the CMSSM's parameter space. We find that the CMSSM's parameters can be accurately determined, with the exception of the common trilinear parameter. Experimental measurements of the relic density by Planck and the Higgs boson's mass slightly improve this determination, especially for the common trilinear parameter. Finally, within our benchmark scenario, we show that the neutralino dark matter will be accessible to direct searches in future one tonne detectors.

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