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Determination of the CMSSM Parameters with Neural Networks at the LHC

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In most extensions of the Standard Model the relation mapping the experimentally measurable quantities onto the parameter values is unknown. In this talk the ability of artificial neural networks to find this unknown relation is demonstrated, by determining the unknown parameters of the CMSSM from quantities that can be measured at the LHC. However, the method should also work for many other new physics models. Explicitly, four different benchmark points with each around 1,000 events after cuts for an integrated luminosity of 10/fb are analyzed, in the context of the LHC with a center of mass energy of 14 TeV. 84 observables are used, most of which are counting observables. The parameters m_0 and m_{1/2} can be determined reliably, with errors as small as 1 % in some cases. With 500/fb of data \tan\beta as well as A_0 can also be determined quite accurately.

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