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# Hunting dark matter signals with deep learning at the LHC

We study several simplified dark matter models and their signatures at the LHC using Neural Networks. We focus on the usual monojet plus missing transverse energy channel, but to train the algorithms we organize the data in 2D histograms instead of event-by-event arrays. This results in a huge performance boost to distinguish between standard model (SM) only and SM plus new physics signals. We found that Neural Network results do not change with the number of background events if they are shown as a function of $S/\sqrt{B}$, where $S$ and $B$ are the number of signal and background events per histogram, respectively. This provides flexibility to the method, since testing a particular model is straightforward, only the new physics monojet cross-section is needed. Furthermore, we also discuss the network performance under incorrect assumptions. Finally, we propose multimodel classifiers to search and identify new signals in a more general way, for the next LHC run.

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