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Implementation of multi-bin searches in CheckMATE

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The use of the combination of information from independent signal regions in statistical tests in high energy physics gives stronger and more robust limits that single-binned analysis. We present the implementation of multi-binned analysis in CheckMATE based on a PYHF implementation of simplified likelihoods. This methods turns out to be superior to the usual limits calculated by CheckMATE using only the expected most sensitive signal region. The validation of this method is discussed using the reinterpretation of various ATLAS searches for supersymmetry.

Primary author: LARA PEREZ, Iñaki

Presenter: LARA PEREZ, Iñaki

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