

# MadMiner: a python based tool for simulation-based inference in HEP

*Wednesday, 7 July 2021 15:00 (30 minutes)*

MadMiner is a python based tool that implements state-of-the-art simulation-based inference strategies for HEP. These techniques can be used to measure the parameters of a theory (eg. the coefficients of an Effective Field Theory) based on high-dimensional, detector-level data. It interfaces with MadGraph and “mines gold” associated to the differential cross-section at the parton level and then passes this information through a detector simulation (e.g. Delphes). Finally, it uses pytorch and recently developed loss functions to learn the likelihood ratio and/or optimal observables. Finally, it can perform basic statistical tests based on the learned likelihood ratio or optimal observables. The package is on distributed on PyPI and has pre-built docker containers for the event generation and learning stages. In addition, there are also REANA workflows that implement common analysis use cases for the library.

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