Contribution ID: **27** Type: **Lightning talk**

dEFT - a pure Python tool for constraining the SMEFT with differential cross sections

Tuesday 6 July 2021 17:50 (10 minutes)

The Standard Model Effective Field Theory (SMEFT) extends the SM with higher-dimensional operators each scaled by a dimensionless Wilson Coefficient c_i to model scenarios of new physics at some large scale Λ. Thus effects of new physics in the LHC data may be sought by fitting the c_i to appropriate LHC data. Differential cross sections have numerous advantages as the inputs to such fits. First, they are abundant and precise, even in extreme regions of phase space where SMEFT effects are maximal. Second, as detector effects have been corrected for, the fits can be performed outside experimental collaborations without access to detailed simulation of the detector response. Third, fits can be continually and easily updated without re-analysis of experimental data as theoretical improvement to SMEFT predictions become available. Fourth, combined fit using data from multiple experiments can be performed with approximations of covariances across experimental data. The differential Effective Field Theory Tool (dEFT) is a pure Python package that aims to automate the fit of the c_i to differential cross section data. The tool generates and validates a multivariate polynomial model of the differential cross section in the N c_i being considered and numerically estimates the N-dimensional likelihood function using the popular emcee package. Bayesian credible intervals in 1-D for each coefficient and 2-D for each pair of coefficients are generated using the corner package. A given fit is entirely defined by a single human-readable json file. Preliminary results from a benchmark analysis using an alpha version of dEFT will be presented to demonstrate the structure and philosophy of the dEFT package and future plans and functionalities towards a first stable release of dEFT will be discussed.

Primary author: KEAVENEY, James Michael (University of Cape Town (ZA))

Presenter: KEAVENEY, James Michael (University of Cape Town (ZA))

Session Classification: Plenary session Tuesday