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The CEDAR event generator validation project

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Monte Carlo event generators are an essential tool for modern particle physics; they simulate aspects of collider events ranging from the parton-level "hard process" to cascades of QCD radiation in both initial and final states, non-perturbative hadronization processes, underlying event physics and specific particle decays. LHC events in particular are so complex that event generator simulations are essential to background modelling, trigger tuning and the analysis of candidate signal events itself.

However, event generators are not fully predictive: various phenomenological parameters must be tuned to experimental data to bootstrap a general purpose generator before physically meaningful predictions can be obtained. The CEDAR collaboration has developed a system for systematic validation of event generators, using archived data from the HepData archive for comparison with generator predictions for a range of observables. The experimental analyses corresponding to each HepData record are performed on simulated data using a generator interface and analysis toolkit named Rivet. CEDAR provides a Web interface to the Rivet system, JetWeb, which stores known generator parameter settings and their comparisons to HepData's records in a relational database. As part of CEDAR, HepData has been significantly restructured to allow JetWeb and other applications to automatically retrieve and process the data archives.

CEDAR also provides a free collaborative development facility, HepForge, for HEP projects which aim to provide useful, well-engineered tools to the community. All the CEDAR projects are available through the portal Web site at www.cedar.ac.uk and the HepForge site at www.hepforge.org.

Submitted on behalf of Collaboration (ex, BaBar, ATLAS)

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