HERWIG

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Abstract
I review the status of the current fortran version of HERWIG. Progress towards its replacement, Herwig++, is reviewed elsewhere in these proceedings.

1 Introduction

HERWIG [1] is a Monte Carlo event generator for simulation of hadronic final states in lepton–lepton, lepton–hadron and hadron–hadron collisions. It incorporates important colour coherence effects in the final state [2] and initial state [3] parton showers, as well as in heavy quark processes [4] and the hard process generation [5]. It uses the cluster [6] hadronization model and a cluster-based simulation of the underlying event [7]. While earlier versions [8] concentrated on QCD and a few other SM processes, recent versions contain a vast library of MSSM [9] and other BSM processes. A review of current Monte Carlo event generators including HERWIG can be found in [10].

We are currently in a period of intense activity, finalizing the HERWIG program and writing a completely new event generator, HERWIG++. In this very short contribution, I can do little more than mention the areas of progress and provide references to sources of more details.

2 HERWIG version 6.5

HERWIG version 6.5 was released [11] in October 2002. Its main new features were an interface to the Les Houches Accord event format [12], the hooks needed by the MC@NLO package [13] and various bug fixes and minor improvements. It was advertised as the final fortran version of HERWIG before work switched to HERWIG++.

Despite this, the period since then has seen intense development with several new subversion releases and new features, most notably version 6.505, which featured an improved interface to the Jimmy generator for multiparton interactions, which I will discuss in more detail shortly. The most recent version is 6.507, which can be obtained from the HERWIG web site [14].

Development of fortran HERWIG is now slowing, and the only new feature still foreseen is the implementation of matrix element corrections to the production of Higgs bosons, both SM and MSSM, preliminary versions of which have been discussed in [15]. Beyond this, the HERWIG collaboration has made a commitment to all running (and ceased) experiments to support their use of HERWIG throughout their lifetimes. Due to lack of manpower, making the same promise to the LHC experiments would divert too much effort away from support of HERWIG++, and we will only support their use of HERWIG until we believe that HERWIG++ is a stable alternative for production running.

3 Jimmy

Early versions of the Jimmy model [16] generated jet events in photoproduction using a multiparton interaction picture. The recent update [17] enables it to work efficiently as a generator of underlying events in high E_T jet events and other hard processes in hadron–hadron collisions for the first time. For a given pdf set, the main adjustable parameters are `PTJIM`, the minimum transverse momentum of partonic scattering, and `JMRAD(73)`, related to the effective proton radius. Varying these one is able to get a good description of the CDF data [18] and other data held in the JetWeb database [19] that are sensitive to underlying event effects in hard process events. However, a poor description of minimum bias data in which there is no hard scale is still obtained. This is probably due to the fact that `PTJIM` is a hard cutoff

and there is no soft component below it; preliminary attempts to rectify this are encouraging [20]. It is interesting to note that with tunings that give equally good descriptions of current data, Jimmy predicts twice as much underlying event activity as PYTHIA at the LHC.

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