

Sherpa Manual Version 2.2.5

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Sherpa 2.2.5 Manual



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1 Introduction

Sherpa is a Monte Carlo event generator for the Simulation of High-Energy Reactions of PArticles in lepton-lepton, lepton-photon, photon-photon, lepton-hadron and hadron-hadron collisions. This document provides information to help users understand and apply Sherpa for their physics studies. The event generator is introduced, in broad terms, and the installation and running of the program are outlined. The various options and parameters specifying the program are compiled, and their meanings are explained. This document does not aim at giving a complete description of the physics content of Sherpa. To this end, the authors refer the reader to the original publication, [Gle08b].

1.1 Introduction to Sherpa	Intro
1.2 Basic structure	Descriptions of modules within Sherpa

1.1 Introduction to Sherpa

Sherpa [Gle08b] is a Monte Carlo event generator that provides complete hadronic final states in simulations of high-energy particle collisions. The produced events may be passed into detector simulations used by the various experiments. The entire code has been written in C++, like its competitors **Herwig++** [Bah08b] and **Pythia 8** [Sjo07].

Sherpa simulations can be achieved for the following types of collisions:

- for lepton–lepton collisions, as explored by the CERN LEP experiments,
- for lepton–photon collisions,
- for photon–photon collisions with both photons either resolved or unresolved,
- for deep-inelastic lepton-hadron scattering, as investigated by the HERA experiments at DESY, and,
- in particular, for hadronic interactions as studied at the Fermilab Tevatron or the CERN LHC.

The list of physics processes that can be simulated with Sherpa covers all reactions in the Standard Model. Other models can be implemented either using Sherpa's own model syntax, or by using the generic interface [Hoe14c] to the UFO output [Deg11] of **FeynRules** [Chr08],[Chr09]. The Sherpa program owes this versatility to