

MadGraph5_aMC@NLO tutorials@UniMi

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Part 0: getting familiar with



What is MADGRAPH5_AMC@NLO?

- It is an **automatic** meta-code that write the code for computing the cross-section and generating events for any process at colliders
- For details: see [arXiv:1106.0522](#), [arXiv:1405.0301](#), [arXiv:1907.04898](#)
- NLO QCD and EW corrections can be included
- Matrix elements of different multiplicities can be combined
 - at LO (CKKW or MLM)
 - at NLO (FxFx or UNLOPS)



Software prerequisites:

- Python 3.7+ (still compatible with Python 2.7)
- Fortran compiler supporting quadruple precision (for NLO)
 - gfortran v4.6+ OK
- Optional:
 - gnuplot
 - FastJet (FJcore is included in the tarball)
 - LHAPDF
 - Herwig++ / Pythia8
 - ...



Where do I get it?

- On LaunchPad: <https://launchpad.net/mg5amcnlo>

5 MadGraph5_aMC@NLO

Overview Code Bugs Blueprints Translations Answers

Registered 2009-09-15 by Michel Herquet

MadGraph5_aMC@NLO is a framework that aims at providing all the elements necessary for SM and BSM phenomenology, such as the computations of cross sections, the generation of hard events and their matching with event generators, and the use of a variety of tools relevant to event manipulation and analysis. Processes can be simulated to LO accuracy for any user-defined Lagrangian, and the NLO accuracy in the case of models that support this kind of calculations -- prominent among these are QCD and EW corrections to SM processes. Matrix elements at the tree- and one-loop-level can also be obtained.

MadGraph5_aMC@NLO is the new version of both MadGraph5 and aMC@NLO that unifies the LO and NLO lines of development of automated tools within the MadGraph family. It therefore supersedes all the MadGraph5 1.5.x versions and all the beta versions of aMC@NLO.

The standard reference for the use of the code is: J. Alwall et al, "The automated computation of tree-level and next-to-leading order differential cross sections, and their matching to parton shower simulations", arXiv:1405.0301 [hep-ph]. In addition to that, computations in mixed-coupling expansions and/or of NLO corrections in theories other than QCD (eg NLO EW) require the citation of: R. Frederix et al, "The automation of next-to-leading order electroweak calculations", arXiv:1804.10017 [hep-ph]. A more complete list of references can be found here: http://amcatnlo.web.cern.ch/amcatnlo/list_refs.htm

Download:

The latest stable release can be downloaded as a tar.gz package (see the right of this page), or through the Bazaar versioning system, using bazaar branch [lp:mg5amcnlo](#)

Installation:

MadGraph5_aMC@NLO needs Python version 2.6 or 2.7 ; gfortran/gcc 4.6 or higher is required for NLO calculations/simulations.

Getting started:

Run bin/mg5_aMC and type "help" to learn how to run MadGraph5_aMC@NLO using the command interface, or run the interactive quick-start tutorial by typing "tutorial". Some third-party packages can be installed using the MG5_aMC shell command "install". LO generation can also be done directly online at: <http://madgraph.phys.ucl.ac.be> or <http://madgraph.hep.uiuc.edu>

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Configuration Progress

Configuration options

Downloads

Latest version is 3.1.x

MG5_aMC_v3.1.0.tar.gz

released on 2021-03-25

All downloads

Announcements

Release of 3.1.0 on 2021-03-29

Version 3.x is now out of beta and is the official version of MG5aMC.



Let's start the tutorial

- On LaunchPad: <https://launchpad.net/mg5amcnlo>
- `tar -xzf MG5_aMC_v3.4.0.tar.gz`
- `cd MG5_aMC_v3_4_0`
- `./bin/mg5_aMC`
- `> tutorial`
- `> tutorial NLO`
- The code will guide you step by step through the basic commands, making sure that you have a working environment