

FAQ

General questions

Q: I would like to download CompHEP. How can I register?

It is a very simple procedure. You need a working email address only. Fill the [form](#) and enjoy the program.

Q: How to get an advice?

- Read the FAQ page,
- Go to [comphep-common](#) mailing list.
- Write a mail to CompHEP collaboration comphep@theory.sinp.msu.ru. Unfortunately the number of questions sometimes exceeds our abilities to reply promptly.

Q: Why should I register on the CompHEP site?

1. We would like to know how many people are using CompHEP and who are they. This information is important for further developments of the package for theoretical and phenomenological applications.
2. The registration confirms that the user agrees with CompHEP Licence.

The information about CompHEP users will not be transferred to a third party or exploited for any purposes without their permission.

Q: What kind of OS do you support?

We cannot support all types of UNIX. Recently we prepared and tested CompHEP for several RedHat clones of Linux. Namely, they are Fedora Core 6/7 and Scientific Linux 3/4 (CERN). Old versions of CompHEP (e.g. 3.23, see the 'Downloads' page) could be installed on HP, SUN and DEC platforms.

CompHEP (v 4.5 and later) has also been tested on Mac OS 10.4.X. More information is available on the page of [MacOS community](#).

We do not support M\$ Windows, but a very old version of CompHEP, compatible with M\$ Windows, is still available (see below).

Q: Do you support M\$ Windows?

No. However, you can try to use old (not supported now) version CompHEP 3.3 from [here](#).

Installation

Problem with libg2c library on 64-bit Linux

The installation of some versions earlier than 4.4 on 64bit lxplus.cern.ch machines, where 32bit libisajet and libmath from cernlib are found by ./configure in the directory /cern/pro/lib may require the following steps:

(0) make clean

(1) correction of CFLAGS: -Wall -DNUM_LONG -DCOMPHEP -m32 instead of -Wall -DNUM_LONG -DCOMPHEP

(2) correction of CLIBS: -L/usr/X11R6/lib instead of -L/usr/X11R6/lib64

then compile by 'make'. In versions 4.5 and later see the configure script options using ./configure -help. Configurations with gcc compiler version 4 (use gcc -dumpversion to see the version number) which does not support -lg2c, should use ./configure -with-gcc4

Q: I am using 64-bit SUSE Linux. How to install CompHEP?

Use CompHEP version for gcc-4

http://comphep.sinp.msu.ru/_media/download/comphep-4.4p3-gcc411.tgz. You must correct the file F77 with respect to the name of Fortran compiler in your system. For 64-bit SUSE Linux the correct name is gfortran-4.1.

— Alexander Kryukov 08/06/2007 16:48

Q: FC5 installation problem: can not find g2c library

To fix the problem add third line (see below) at the end of *configure* file by the following way:

```
echo $CC      > CC
echo $CFLAGS > CFLAGS
echo $CLIBS -L/usr/lib/gcc-lib/i386-redhat-linux/3.2.3/ > CLIBS
```

Q: How to compile CompHEP in the D0 collaboration environment?

For some unknown reasons one needs to unsetup D0 RunII environment before compiling CompHEP.

CompHEP features

Q: What value of the parameter Q^2 should be used for pp→tT process?

Q^2 is the QCD factorization scale. A choice of Q^2 depends on a process under study. For the top pair production a proper choice of the scale is $Q^2 = M_{\text{top}}^2$, as confirmed by the NLO computations performed by several groups.

- Edward Boos

Q: What does the 'width scheme' mean?

Any generator uses the propagators with finite width (exact propagators or Breit-Wigner propagators) for calculation of the amplitude. Generally speaking, replacement of the chronological products by the exact propagators violates the gauge invariance and the unitary behavior of the amplitude, which is ensured by *gauge cancellations* (especially important for the complete tree level sets of diagrams including t-channel photons/gluons; see for details 'the bibliography' page). There are three schemes of the finite width insertion.

- **“fixed” width scheme:** the Feynman propagator is replaced by the Breit-Wigner propagator with constant width;
- **“running” width scheme:** the Feynman propagator is replaced by the Breit-Wigner propagator with the s-dependent width (see CERN Yellow reports on the LEP physics, 'the bibliography' page);
- **“overall” scheme:** the program sums symbolically all diagrams, then replaces the Feynman propagators by the Breit-Wigner ones substituting factors in the common denominator. This prescription is gauge invariant and preserves gauge cancellations, but in some cases leads to strong artificial suppression of non-resonant contributions.

The user should make his choice of the scheme depending on a concrete physics process and problem.

Known CompHEP problems

Q: When I try to display squared diagrams for 6 final particles the CompHEP stops

Indeed, diagrams generator does not support drawing of diagrams with 6 particles in the final state. However, this does not affect the calculation of diagrams.

Q: Is it possible to calculate a process with 8 out-particles (and more)?

By default, the parameter MAXINOUT is restricted to 10 (2in+8out particles). You can change this parameter (see the file src/include/model.h) and recompile CompHEP by 'make' command. However, we do not guarantee correct work of the program in this case. The diagrams generator does not support 2→8 images.

For decay processes the total number of particles should be strictly less than MAXINOUT value.

— Alexander Kryukov 28/06/2007 16:27

Q: What does it mean "Warning! X=7.715561E-07 out of range"

Warning! X=7.715561E-07 out of range

and so on is not a CompHEP warning. It is a warning of pdf (partonic density functions) library used by CompHEP.

When you are using proton structure functions (e.g. CTEQ, MRST, etc.) they are evaluating pdf's which are functions reconstructed using some fits of experimental data. Experimental data (mainly HERA deep inelastic scattering data) is available only in the kinematic range $x > 10^{-3}$, where x is scaling variable (Bjorken or Feynman variable).

In your case some object with low effective mass is produced by protons $\hat{s} = x_1 x_2 s$, so the kinematic range for x is of the order of 10^{-7} . Pdf libraries are using some extrapolation based on available data at 10^{-3} to the region 10^{-7} and issue a warning on the reliability of the result. For detailed information you can address the authors of pdf.

Problems with cpyth and formats of CompHEP event files

Q: I have my favourite CompHEP model with new particles and I prepared an event sample with particles in the final state. How can I pass events to PYTHIA?

cpyth will stop if you try to pass the events through the default interface. PYTHIA should know the particle code of a new particle. So if a particle has the standard code, correct the routine kfpars in `cpyth-*/*/src/comphep/kfcodes.c`. If a particle does not have the code, you can add an artificial number. But this will not work in all cases, if PYTHIA does not know the particle.

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Last update: **01/01/2017 15:14**

