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Forward Physics Analysis Software

Goal

The goal of this page is to describe the specific software that is used in the analysis done in Forward Physics Group. The main group page is CMS Forward physics.

Analysis software

The common Forward physics analysis software resides in the [CMSSW/DiffractiveForwardAnalysis](#) package in the CMSSW cvs directory. It contains subdirectories for performed analysis. Below one can find links to each analysis Software Page.

- Exclusive dilepton software page, see also the physics analysis page for this analysis - [here](#)
- Upsilon photoproduction software page, see also the physics analysis page for this analysis - [here](#)
- Luminosity measurement with exclusive muon pairs software page, see also the physics analysis page for this analysis - [here](#)
- Single diffractive W production software page, see also the physics analysis page for this analysis - [here](#)
- Single diffractive dijet production software page, see also the physics analysis page for this analysis - [here](#)
- Forward jets software page, see also the physics analysis page for this analysis - [here](#)
- Jet-Gap-Jet software page, see also the physics analysis page for this analysis - [here](#)
- Exclusive diffractive B+ production software page, see also the physics analysis page for this analysis - [here](#)
- Underlying event and multi-parton interactions production software page, see also the physics analysis page for this analysis - [here](#)

Simulations

Detector and transport

- HECTOR - a stand-alone code to simulate the proton transport through the LHC beamline up to 420m from the interaction point. It resides in the [CMSSW/SimTransport](#) directory of the CMSSW cvs repository. Here are the instructions on how to run HECTOR in CMSSW.
- The Proton taggers - package provides a method to simulate the acceptance of detectors installed 420 and 220 m from IP5 (in both beam directions). The code for Fast Simulation resides in the [CMSSW/FastSimulation/ProtonTaggers](#) directory of CMSSW cvs repository. Code for Full Simulation is not yet available.

MC generators

- [HARDCOL](#) is an PYTHIA based event generator that simulates elastic parton-parton scattering by hard color singlet exchange, calculated from the BFKL equation. Here are the instructions on how to use HARDCOL in FWD PAG group.
- [POMWIG](#) is a modified version of [HERWIG](#) which can generate diffractive interactions. All standard HERWIG hard subprocesses are available for pomeron-proton, photon-pomeron and pomeron-pomeron collisions. The interface for this generator resides in [CMSSW/GeneratorInterface/PomwigInterface](#) directory of the CMSSW cvs repository. Here are the instructions on how to run PomwigInterface in CMSSW.

- ExHuME [↗](#) is a Monte Carlo simulation of central exclusive production. It implements the Khoze-Martin-Ryskin [↗](#) pQCD calculation of $p p \rightarrow p X p$, where X is a centrally produced colour singlet system. Its interface resides in `CMSSW/GeneratorInterface/ExhumeInterface ↗ directory of the CMSSW cvs repository. Here are the instructions on how to run ExhumeInterface in CMSSW.`
- EDDE [↗](#) is a Monte Carlo event generator for different Exclusive and Semi-Inclusive Double Diffractive processes. The interface for this generator resides in `CMSSW/GeneratorInterface/EDDEInterface ↗ directory of the CMSSW cvs repository. Here are the instructions on how to run EDDEInterface in CMSSW.`
- Madgraph/Pythia procedure for generating two-photon processes and using the result in CMSSW.
- Procedure for using LPAIR two-photon processes using the HepMC interface prior to the 3_1_X LHE Generator Interface migration.
- Procedure for using LPAIR two-photon processes with CMSSW after the 3_1_X LHE Generator Interface migration.
- Procedure for generating photoproduced upsilons with Phiti and Starlight MC generators in CMSSW.

MC productions

Here is the MC generator productions used in different analysis. Not all of the productions are listed. For specific productions used in different analysis check the analysis pages.

2009 Production

- FAMC at 10 TeV requests [↗](#)
- Summer09 Production

2008 Production

- Summer08 Production
- Forward PAG Private Samples

2007 Production

- 100M CSA07 Standard Model cocktail
- CSA07 Signal Production
- Diffraction and Forward Phys. group CSA07 Generation Requests & Validation
- Diffraction and Fwd. Phys. group Skims & Validation
- Skim tests with exclusive dileptons
- CSA07 exclusive dileptons analysis
- Forward PAG Private Samples

Review status

Reviewer/Editor and Date	Comments
KatiLassilaPerini - 8 Jan 2008	created template page

Responsible: GrzegorzBrona

Last reviewed by: *Never reviewed*