How to start

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Introduction

- You need at least three steps
  - generation of your signal and backgrounds
    - at a given energy
      - we will use Pythia8 (+ hepmc)
  - simulation of the response of a detector
    - we will use Delphes (from hepmc to reconstructed particles)
      - parametrized detector simulation
  - analysis
    - we will use a simple root macro (from reconstructed particles to plots/measurements)

Steps (1)

- download Pythia + Delphes (from Maurizio)

```
mkdir FCC
cd FCC
export SCRAM_ARCH=slc6_amd64_gcc491
scram project CMSSW_7_4_0
cd CMSSW_7_4_0/src/
eval `scramv1 run -sh`
export CMSSW_FWLITE_INCLUDE_PATH=""
cd ../../
cp ~mpierini/public/BSMatLHC.tar.gz .
tar -xzf BSMatLHC.tar.gz
rm BSMatLHC.tar.gz
cd BSMatLHC
python script/ToBuild/compile.py
```

from Maurizio

- edit Pythia cards

-

```
cd /BSMGen
source setup.sh
cp /afs/cern.ch/user/d/degrutto/public/forFCC/*pythia* .

 ./GenPythiaToHepMC  HZ_H2bb_Z2mm.pythia HZ_Hbb_Z2mm_100evts.hepmc > log_hz_100.log
 ./GenPythiaToHepMC  zz.pythia  zz_100evts.hepmc  > log_zz100.log
```

Steps (2)

- Delphes
  - follow https://indico.cern.ch/event/315979/

```
./DelphesSTDHEP examples/delphes_card_FCC_basic.tcl step_1.root /afs/cern.ch/user/s/selvaggi/public/delphes_tuto/ee_zh_mmbb.hep
```

  - the details is the detectors configuration…
  - last CMS like is
    - /afs/cern.ch/user/l/llai/public/delphes_card_CMS_newEfficiency.tcl

- ROOT

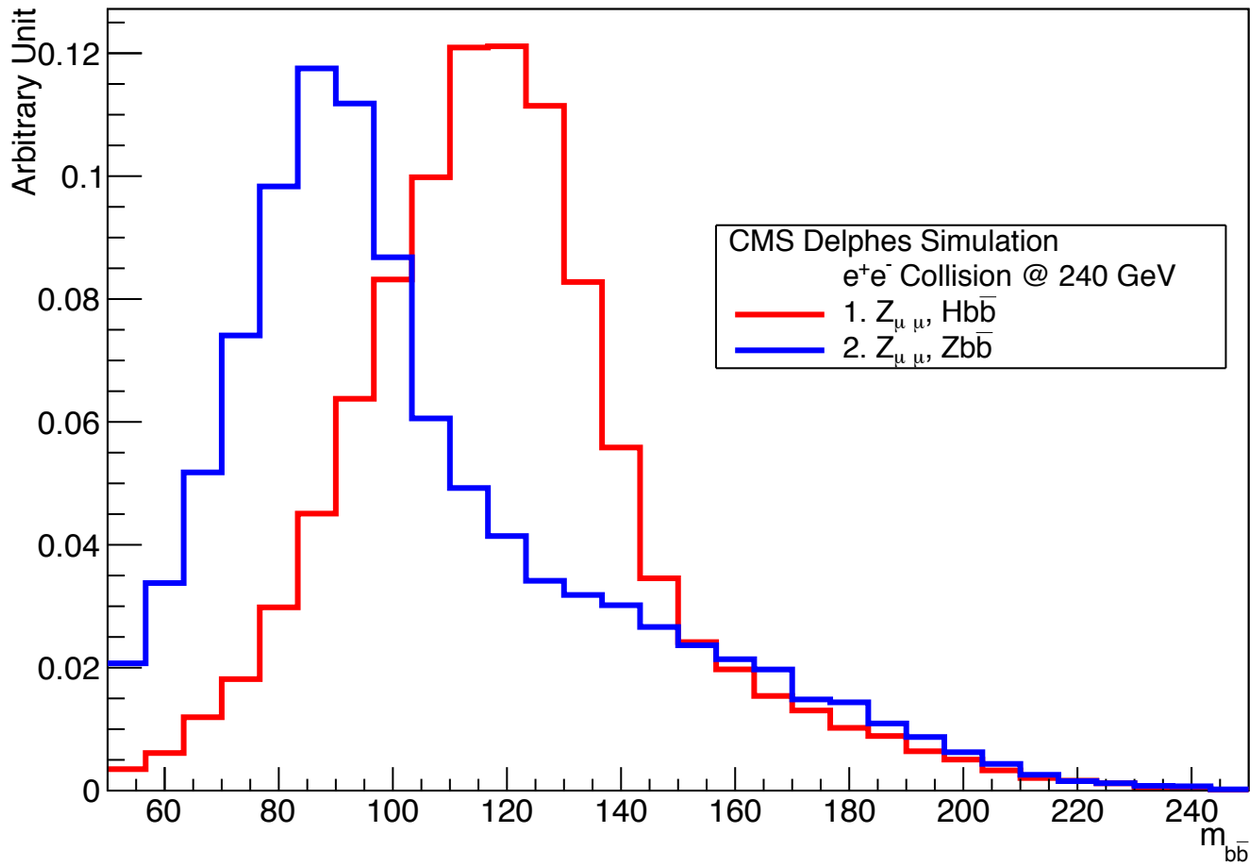
```
1. Start ROOT and load shared library:

  root -l
  gSystem->Load("libDelphes");

2. Open ROOT tree file and do some basic analysis using Draw or TBrowser:

  TFile::Open("step_1.root");
  Delphes->Draw("Muon.PT", "Muon.PT > 20");
  Delphes->Draw("Jet.PT", "Jet.BTag > 0");
  TBrowser browser;


..............
```

Physics

- I'm interested in Higgs physics
  - H->inv or H->bb for example

- Laura is working on H->bb coupling

from Laura Lai



BACKUP