Universität Zürich

Towards the measurement of the top-quark mass

Silvio Donato
(silvio.donato@cern.ch)
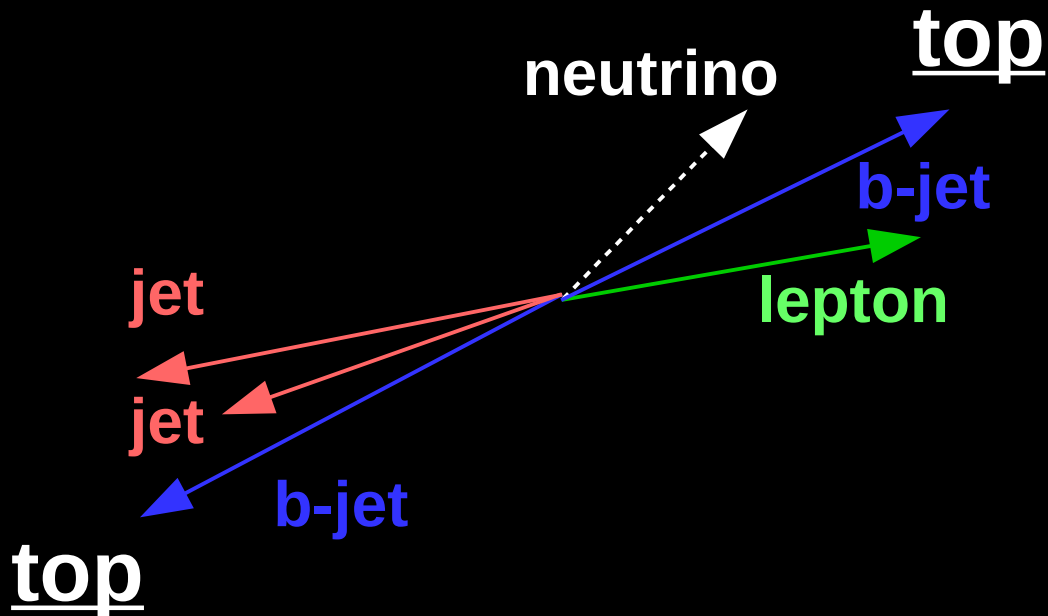
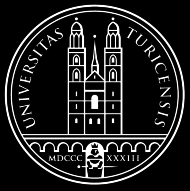*http://sdonato.web.cern.ch/sdonato/UZH*

Introduction

- The aim of the long exercise is to measure the top-quark mass in the semi-leptonic channel.

- As first step, we will measure a simpler process: the Z mass.

top

neutrino

b-jet

jet

lepton

jet

b-jet

top

Z mass

- We look for the Z → $\mu\mu$.

- Find a selection and define a plot to see the Z mass peak.

- Define a function that "moves" the DY template of 1 bin.

- Define a function that evaluated the log-likelihood given data and MC histos (see previous lectures).
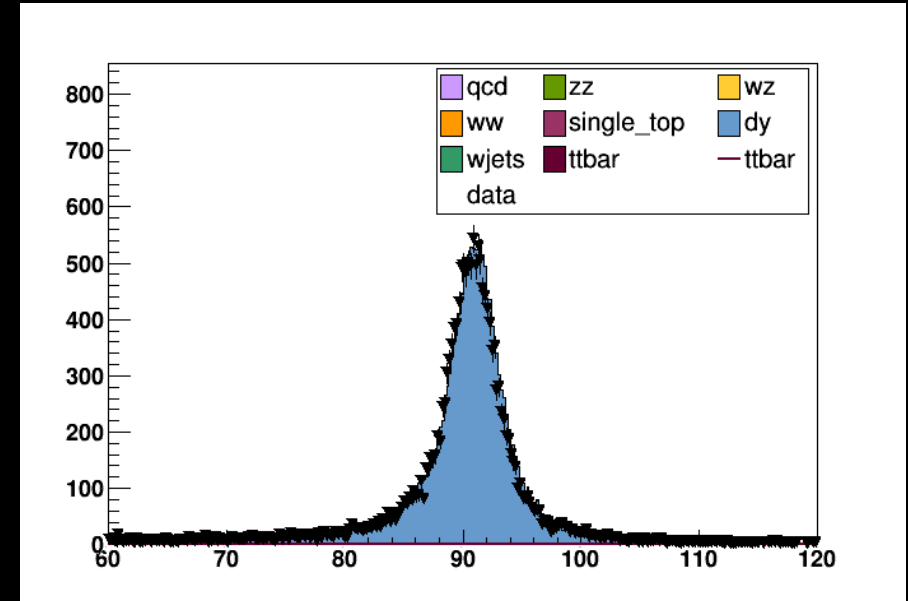

```
bkg = getBkgHisto(var, samples, signal="dy")
sig = getSigHisto(var, signal="dy")
data = getDataHisto(var)
```
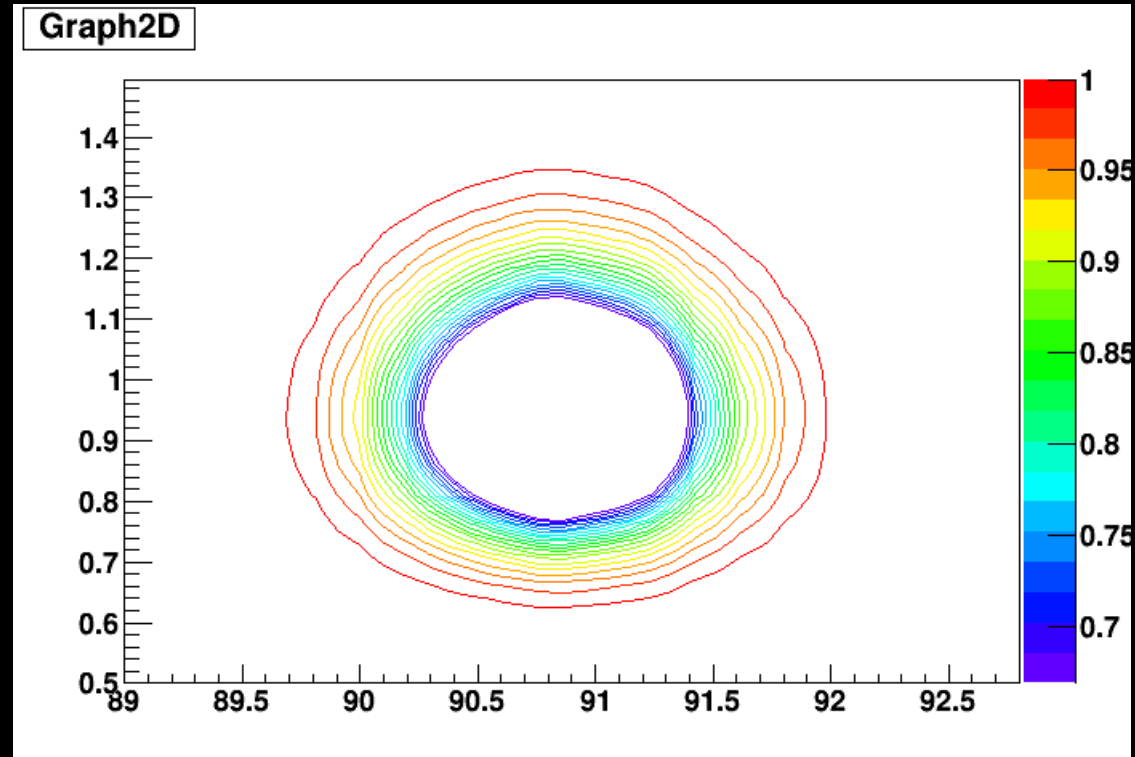
Z mass

- Perform a 2D likelihood scan of the Z → $\mu\mu$ cross section and mass.

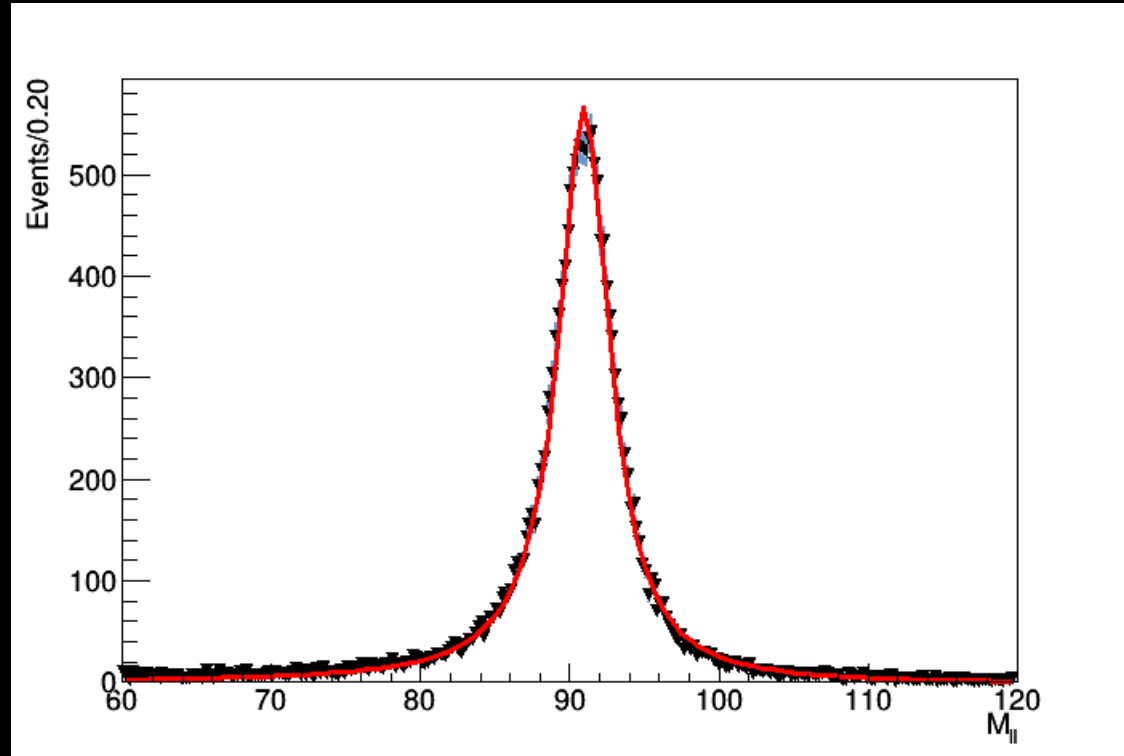- Findhe 95% and 68% confidence limit.

TMath.Prob(chi2,ndof)

gives you the probability to have a χ^2 > chi2, given ndof number of degrees of freedom.
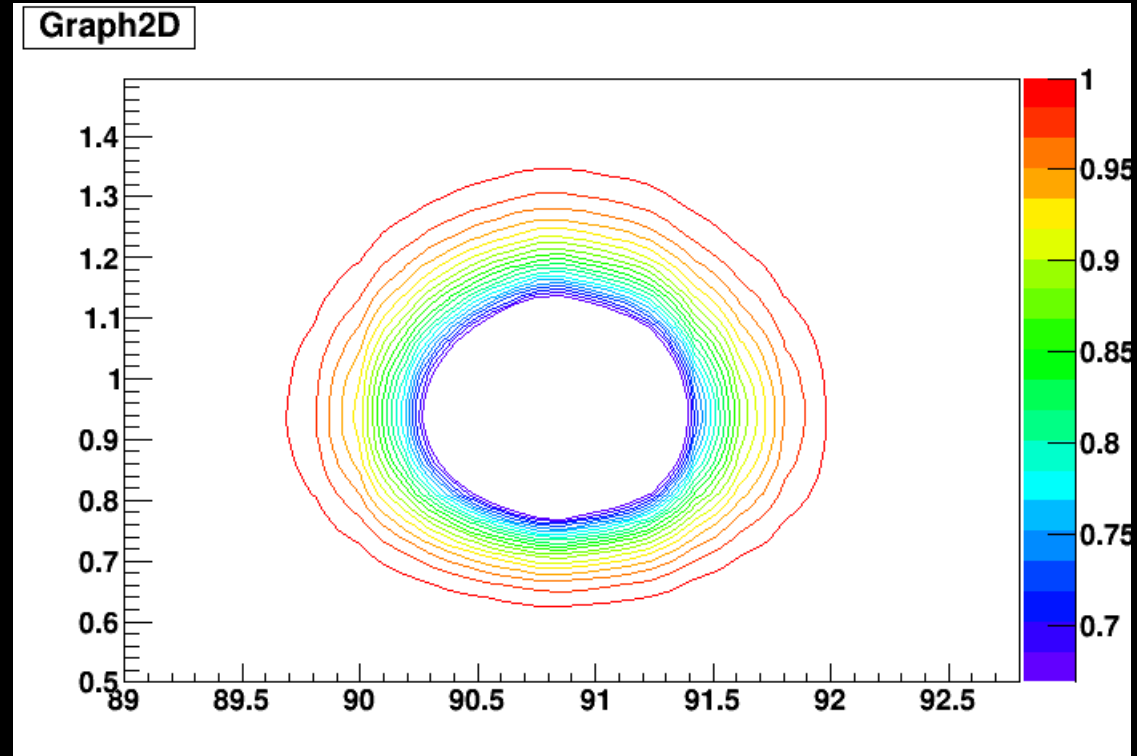
Z mass

- Plot the Z mass distribution for DY simulation and fit it with a function.
  - which function should we use?
    (you can use books/internet :-)).

Z mass

- Repeat the measurement of the Z → μμ cross section and mass using a function, instead of a histogram, as signal template.

top mass

- Try to figure out how to see the top (and W) mass peak.

top

neutrino

b-jet

jet

lepton

jet

b-jet

top