Measurement of Top Quark Pair Differential Cross-Sections.

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**Motivation**

First measurement: The presented results are the first measurements of external differential cross sections in top quark pairs at 7 TeV.

- Basis setting of pT cuts for heavy-flavour production at LHC energy scale.
- Can constrain potential physics beyond the SM.
- Sensitivity to PDF.

**Top quarks at the LHC**

Production

At a production cross section of 165 pb (NNLO approx) about 190 thousand top quark pairs have been produced in the analysed dataset of 1.14 fb, mainly by gluon-gluon fusion. The LO diagrams are shown here.

- Events outside Z peak (events in the WZ channels the production is close to the integrated cross section and the unfolding corrections. Cross section is then calculated as:
- The detector acceptance restricts the measurement to a certain "visible" phase space. The detector acceptance cuts the measurement to a certain "visible" phase space.

**Event selection**

To determine the large backgrounds from non-top standard model processes, at least one top quark is required to decay leptonically. In addition the selection makes use of the jets from the quark and the missing transverse energy from the neutrino.

- Events from the WZ channels.
- Events from the Z+jets channel.
- Events from the W+jets channel.
- Events from the Z+jets channel.
- Events from the W+jets channel.

**Background determination**

The main background is the dilepton ee and ee channel. For this the dilepton channel is from Drell-Yan events. It is obtained as a data-driven only from the events in the 2 closes peaks (20 GeV > pT > 20 GeV).

- Events inside the peak region.
- Events outside the peak region.
- Events inside the peak region.
- Events outside the peak region.
- Events inside the peak region.
- Events outside the peak region.

**Cross section calculation**

In each list of the hadronisation process, the parton-level cross section can arise from a variety of different samples. To correct for the migration, a bin-by-bin and SVD unfolding have produced results.

- Events in the dilepton channels.
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- Events in the dilepton channels.
- Events in the dilepton channels.

**Systematic uncertainties**

Systematic uncertainties of the measurement arise from detector effects as well as theoretical uncertainties. Each systematic is investigated separately and determined individually in each bin of each measurement by varying the corresponding input source within its uncertainty. The cross section result is then recalculated and the difference with the nominal result is added in quadrature.

- Events in the dilepton channels.
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**Results**

**Lepton+jets channel**

- Events in the dilepton channels.
- Events in the dilepton channels.
- Events in the dilepton channels.
- Events in the dilepton channels.
- Events in the dilepton channels.
- Events in the dilepton channels.

**Dilepton channel**

- Events in the dilepton channels.
- Events in the dilepton channels.
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- Events in the dilepton channels.

**Combined**

- Events in the dilepton channels.
- Events in the dilepton channels.
- Events in the dilepton channels.
- Events in the dilepton channels.
- Events in the dilepton channels.
- Events in the dilepton channels.