



SPEAKER: Victor Coco (CERN)

TITLE: **Observation of top-quark production in the forward region with LHCb**

DATE: Tue 26/05/2015 11:00

PLACE: Main Auditorium

## ABSTRACT

As differential NNLO theory predictions become available, both single top and top pair production cross-section measurements in the forward region will provide important experimental tests.

Top pair production in the forward region can also constrain the gluon density function in the proton at large momentum transfer, which are responsible for large uncertainties in many SM predictions.

Forward top production is observed, in the  $\mu + b$  final state, with the  $3 \text{ fb}^{-1}$  Run I dataset collected by the LHCb detector. The cross-section for the combined  $t\bar{t}$  and single- $t$  at  $\sqrt{s}=7 \text{ TeV}$  and  $\sqrt{s}=8 \text{ TeV}$  is derived, for muons from the  $W$  boson with  $p_{T,\mu} > 25 \text{ GeV}$  in the pseudo-rapidity range  $2.0 < \eta < 4.5$  and with a  $b$ -tagged jet with  $50 < p_{T,j} < 100 \text{ GeV}$  in the pseudo-rapidity range  $2.2 < \eta < 4.2$ . The production cross-sections are found to be in agreement with NLO prediction.

This measurement has been made possible thanks to recent development in the heavy flavour jet tagging at LHCb and to the analysis techniques developed for the measurement of the  $W$  boson production in association with beauty and charm.

The heavy flavour tagging performance and its calibration in data will be presented, as well as the measurement of the fraction of  $W+c$  and  $W+b$  in  $W+\text{jet}$  events, together with the charge asymmetries of the  $W+b$  and  $W+c$  production cross-sections. These production ratios are sensitive to the parton density function, in particular those of the strange quark (in  $Wc/Wj$ ) and the intrinsic  $b$  quark content of the proton (in  $Wb/Wj$ ). The ratio of the  $W+\text{jet}$  to  $Z+\text{jet}$  production cross-sections is also measured using the  $Z \rightarrow \mu\mu$  decay. Measurements are found to be in agreement with Standard Model.