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PRINCIPAL LHCC DELIBERATIONS

8TH MEETING OF THE TOTEM RESOURCES REVIEW BOARD

12 APRIL 2011

EMMANUEL TSESMELIS

SCIENTIFIC SECRETARY, LHCC

GENERAL

This document summarizes the principal LHCC deliberations concerning TOTEM at the Committee's sessions in November 2010 and March 2011.

The LHCC congratulates TOTEM for the successful installation and commissioning of the T1 Telescope and of the Roman Pot detectors for the stations at 147 m. during the 2010-2011 Technical Stop.

CONCERNS FROM THE PREVIOUS TOTEM RESOURCES REVIEW BOARD

SUB-SYSTEM	CONCERN	STATUS
T1 Telescope	Completion of the T1 Telescope.	The T1 Telescope was successfully installed and commissioned during the 2010-2011 Technical Stop.

STATUS OF THE EXPERIMENT

T1 TELESCOPE

TOTEM successfully installed and commissioned the T1 Telescope during the 2010-2011 Technical Stop.

ROMAN POTS

TOTEM successfully installed and commissioned the Roman Pot detectors for the stations at 147 m. during the 2010-2011 Technical Stop.

PHYSICS RUNNING

The analysis of the first events collected by the T1 Telescope shows a performance consistent with the expectations. This also confirms, however, the limit to the maximum instantaneous luminosity that can be tolerated by the detector, around 1×10^{30} cm^{-2} s^{-1}. A corresponding limitation for the T2 Telescope is 1×10^{31} cm^{-2} s^{-1}. Therefore, given that the LHC luminosity is already above 1×10^{31} cm^{-2} s^{-1} since the start of the 2011 run, the T1 and T2 Telescopes cannot any longer make good use of the nominal beam set-up with one or a few low-current bunches.

Special low-luminosity runs are therefore needed by the TOTEM experiment to enable the low-β^* physics programme with the T1 and T2 Telescopes. These runs would require about 20 bunches, with 1×10^{10} protons/bunch, leading to luminosities in the range of 2×10^{28} to 2×10^{29} cm^{-2} s^{-1} with β^* values between 11 m. and 1.5 m., respectively. During these runs the Roman Pot detectors would

be inserted to ~5σ from the beam. Three hours of data taking would enable the collection of 1×10^6 to 1×10^7 minimum-bias-triggered events. Three such runs are requested by TOTEM through the year. The LHCC **recommends** the first of such runs to take place as soon as the conditions conveniently allow it, and additional runs to take place after the assessment of the results of the first run will be completed. The overall number of special runs should be minimized.

The LHCC welcomed the progress of the elastic cross-section measurement, where a diffractive peak is clearly visible. The completion of the measurement requires the final determination of the acceptance and efficiency corrections and systematic uncertainties, and is expected within a few weeks. The measurement at larger t-values needs to be improved, with additional statistics collected by the Roman Pots. The experiment requests to take data during standard runs, positioning the Roman Pots at about 14σ from the beam. The LHCC **recognizes** this request, subject to the standard monitoring and approval of the LHC Programme Co-ordinator. The LHCC also **recognizes** the request to allow the Roman Pot alignment at nominal conditions after each optics change. This requires some data-taking close to the beam, with one nominal bunch plus a few mini-bunches.

The first TOTEM measurement of the total cross-section will need data-taking with large β* optics. The LHCC **confirms** its endorsement of the request to the preparation for runs at β*=90 m as soon as possible, and **recommends** a close co-ordination with the requests of the ATLAS ALFA Roman Pot detector.