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PRINCIPAL LHCC DELIBERATIONS

9TH MEETING OF THE TOTEM RESOURCES REVIEW BOARD

18 OCTOBER 2011

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GENERAL

This document summarizes the principal LHCC deliberations concerning TOTEM at the Committee's sessions in June 2011 and September 2011.

The LHCC congratulates TOTEM for their successful physics runs and for the first measurement of the total cross-section.

CONCERNS FROM THE PREVIOUS TOTEM RESOURCES REVIEW BOARD

No major concerns were reported to the previous TOTEM Resources Review Board.

PHYSICS RUNNING

The first TOTEM measurement of the total cross-section was obtained from data collected in June 2011 during a special run with $\beta^*=90$m. The measurement relies on the optical theorem, the extrapolation of the differential elastic rate at $t=0$, and the luminosity determination by CMS. Thanks to the excellent detector performance, and to robust studies of alignment, optics, acceptance, and backgrounds amongst other parameters, the systematic uncertainty, of the order of 3%, is dominated by the luminosity uncertainty.

The next step in TOTEM's physics programme is therefore the "luminosity independent" measurement of the total cross-section. For this, the elastic rate at small-t must be complemented with the determination of the total inelastic rate. Having completed the commissioning of the T1 and T2 Telescopes, and their integration with the Roman Pot stations at 220m (RP220) in a complete trigger and DAQ system, the measurement of the inelastic rate will be possible during a new run with $\beta^*=90$m. A dedicated run, of at least 5 hours of data-taking with the vertical RP220 detectors positioned at 5σ from the beam, was scheduled for this purpose at the end of September 2011.

An additional special run with $\beta^*=90$m is requested for October 2011. This should allow the alignment of the Roman Pot stations at 147m (RP147), and provide data necessary for the measurement of diffractive phenomena.

For 2012, TOTEM envisages the possibility of special runs with β^* values as large as possible, in the range of several hundred metres and up to a kilometre. This would enable elastic scattering measurements near the region of Coulomb interference, and a possible measurement of the ρ parameter. The Committee will review this request next year, when the planning of LHC operations will be defined.

The LHCC welcomes the information that discussions have started between TOTEM and CMS to identify opportunities for joint triggering and data-taking, and looks forward to concrete steps leading to common measurements in the area of diffraction already in 2012.

RECOMMENDATION: The Committee **endorses** the request for an additional special run with $\beta^*=90$m for October 2011, but **recommends** that, should the possibly limited machine time become an issue, priority must be given to the completion of the diffractive physics programme with the T1 and T2 Telescopes over the alignment of RP147.