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PRINCIPAL LHCC DELIBERATIONS

7TH MEETING OF THE TOTEM RESOURCES REVIEW BOARD

12 OCTOBER 2010

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GENERAL

This document summarizes the principal LHCC deliberations concerning TOTEM at the Committee's sessions in May, July and September 2010.

Good progress was reported on the completion of the TOTEM experiment. The LHCC expressed its appreciation of the CMS and TOTEM Technical Co-ordinations' constructive collaboration during preparations for the installation of the TOTEM T1 Telescope.

CONCERNS FROM THE PREVIOUS TOTEM RESOURCES REVIEW BOARD

SUB-SYSTEM	CONCERN	STATUS
T1 Telescope	Completion of the T1 Telescope.	The LHCC endorses the request to install the full T1 Telescope system during the forthcoming 2010-2011 technical stop, subject to the positive outcome of the final Installation Readiness Review, which is scheduled to take place in early November 2010.

STATUS OF THE EXPERIMENT

T1 TELESCOPE

The LHCC noted the great technical progress made after the T1 Telescope installation Engineering Design Review of July 2010. All recommendations from the review have been or are being followed up, including modifications of the mechanical structures, a review of grounding and electrical integration, leak tests, and the validation of the T1 Telescope envelope. The latest estimate of the work schedule is compatible with the installation of the negative side of the T1 Telescope within the foreseen LHC technical stop of 2010-2011, while the complete installation, including the positive side, would require an extra two weeks.

The LHCC acknowledges that the physics programme in 2011 would benefit from the additional acceptance and redundancy offered by the complete T1 Telescope. Among other items, this will better enable the characterization of single diffractive (SD) and double diffractive (DD) events, as needed to extrapolate to the unobservable cross section.

Therefore, the Committee endorses the request to install the full T1 Telescope system during the forthcoming 2010-2011 technical stop, subject to the positive outcome of the final Installation Readiness Review, which is scheduled to take place in early November 2010. Nevertheless, the LHCC would like to see at its November 2010 session some results of full simulation to quantify the

improved characterization obtained with the full T1 Telescope installation, by for example demonstrating the improved resolution on the mass of the observable system in SD and DD events.

T2 TELESCOPE

The thresholds and the high voltage of T2 have been adjusted to reduce noise and optimize efficiencies, and the five faulty planes have also been recovered. However, the T2 Telescope is still sensitive to noise created by CMS calibrations and runs. The environment with nominal bunches is considered hostile due to a large number of secondaries and low- p_T loopers. Optimization studies in hardware and software are in progress, and the foreseen runs with lower bunch intensities and hence lower pile-up will provide better operating conditions.

ROMAN POTS

The installed Roman Pot (RP) detectors are in excellent condition, with only 1% of noisy/dead channels. Latency scans with active triggers have been completed. Absolute positioning studies have started successfully with 450 GeV beams and were recently repeated with 3.5 TeV beams. The obtained positions of all RPs were successfully verified with the data and hence the ultimate goal of allowing the RP insertion during normal "stable beam" operations, possibly down to 15σ or less, has been achieved. Special runs with RP distances down to 7σ have been taken. Elastic proton scattering events with a very clean topology have been observed for the first time at the LHC. Production of the detectors for the RP at 147m is in progress, and is on schedule for testing in H8 and installation in the tunnel during the upcoming 2010-2011 technical stop.

The LHCC expressed its appreciation of the work of the TOTEM Collaboration and of the constructive collaboration with the LHC machine experts.

PHYSICS RUNNING

More work is desirable to better define the scope and reach of the 2011 run and to fully exploit the potential of the full TOTEM detector system. TOTEM is quickly ramping up the understanding of the collected data, showing a continuously improving control of the detectors' behavior and of the beam-related systematic errors. For example, a preliminary t -distribution - the squared momentum transfer - of the elastic scattering has been presented.

The LHCC acknowledges the need for runs with special conditions or optics (e.g. the runs at $\beta^*=90\text{m}$). Therefore, the Committee recommends the continued collaboration of the accelerator physicists with TOTEM to prepare and work out realistic running scenarios satisfying these needs. The Committee will need to review the readiness of the experiment to take full benefit of these runs before it can endorse them, if so requested.

The Committee repeats its earlier recommendation that TOTEM and CMS work together towards an integration of their detectors, trigger and DAQ in view of the physics runs beyond 2011.