TOTEM

Stato dell'esperimento

Attività di Pisa/Siena

Composizione Gruppo

Richieste 2019

Nicola Turini

on behalf of the
TOTEM PISA/SIENA Group

CMS-Totem merging

- MoU signed in April 2018
  - CT-PPS -> PPS
    - Pisa/Siena group enters in CMS
  - Pisa/Siena group responsible of the Timing detectors of PPS for RunIII.
  - Nicola Turini is responsible for the “consolidation/ upgrade of the timing stations”
- Totem remains as a Standalone Experiment for the pp cross section measurement at 14 TeV (primary mission) and the ρ parameter in 2021. (Nicola still Deputy Spokeperson of Totem)

Totem Standalone

- T2 detector
- Simple plastic scintillator detector.
  - Passive detector in the high radiation area (minimize installation time)
  - Optical fibers fan out -> SiPm readout.
  - Pisa/Siena group will be responsible of the interface electronics and mechanics
    - Reuse most of the electronics developed in Pisa.
    - Need to develop the interface card from SiPm-Discriminators (NiNo) and use the PPS Digitizer board as standard readout electronics.

New T2

Il TDR per il rivelatore è stato presentato a LHCC in giugno per l'approvazione a settembre. Prima del Gr1.

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

TOTEM TDR–004
31 May 2019

CERN–LHCC 2019-xxx
31 May 2019

TDR - Upgrade of the TOTEM T2 Telescope

The TOTEM Collaboration

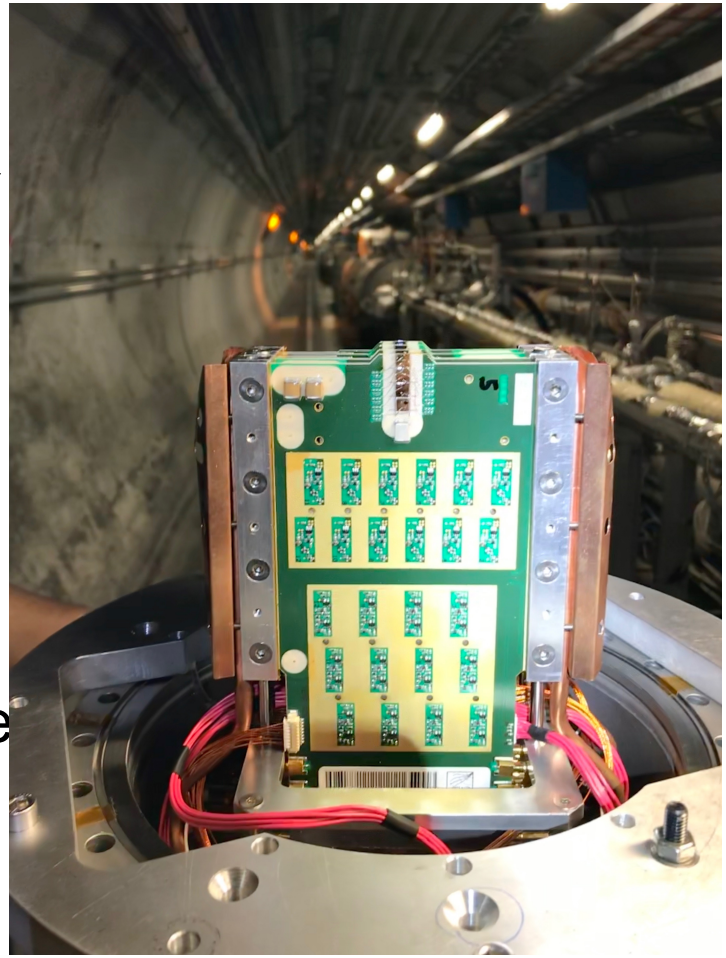
Abstract

A new T2 detector for the TOTEM experiment is designed to measure the rate of inelastic proton-proton events in low luminosity special runs dedicated to the measurement of the total cross section at the highest LHC energy. With a pseudorapidity coverage of $5.3 < |\eta| < 6.5$, the new T2 will detect more than 90 % of the inelastic events at a center-of-mass energy of 14 TeV and thus allow a precise inelastic rate and total cross section measurement. The corresponding elastic cross section will be used to normalize elastic differential cross section measurements at the same energy. The present TDR describes the physics motivation, the running scenarios, the technical requirements, the electronics and readout system as well as the construction timeline of the new T2.

Keywords: pp Total Cross Section, Detector, Tracking.

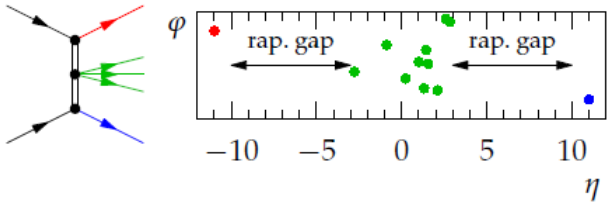
PPS

- Timing detectors in RunIII
  - Old detectors has been removed from the Tunnel and tested in DESY
  - New Hybrid design to improve resolution
  - Pisa/Siena responsible of FEE, readout electronics and cabling.
  - R&D to optimize the preamplifier stages ongoing. New design to be finalized by Christmas .
  - New electronics in production for the doubling of the timing stations.

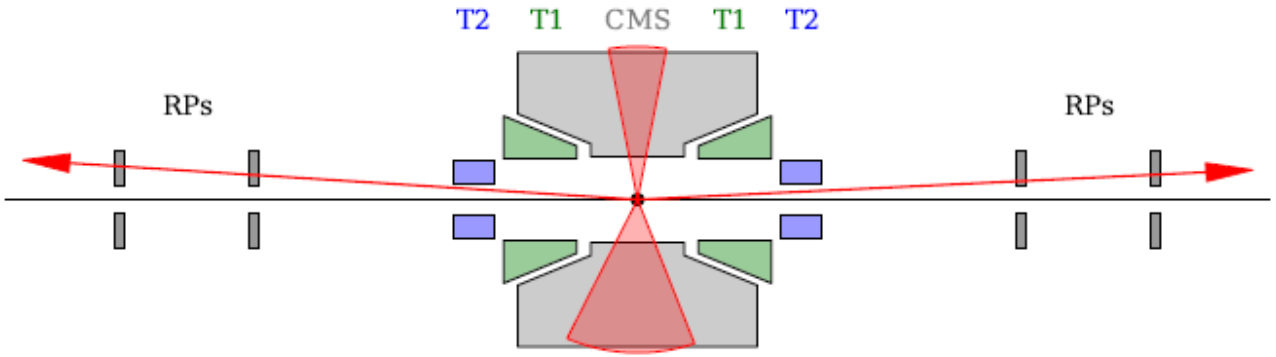


Diffractive Physics Program
LHC Run II/RunIII
PPS

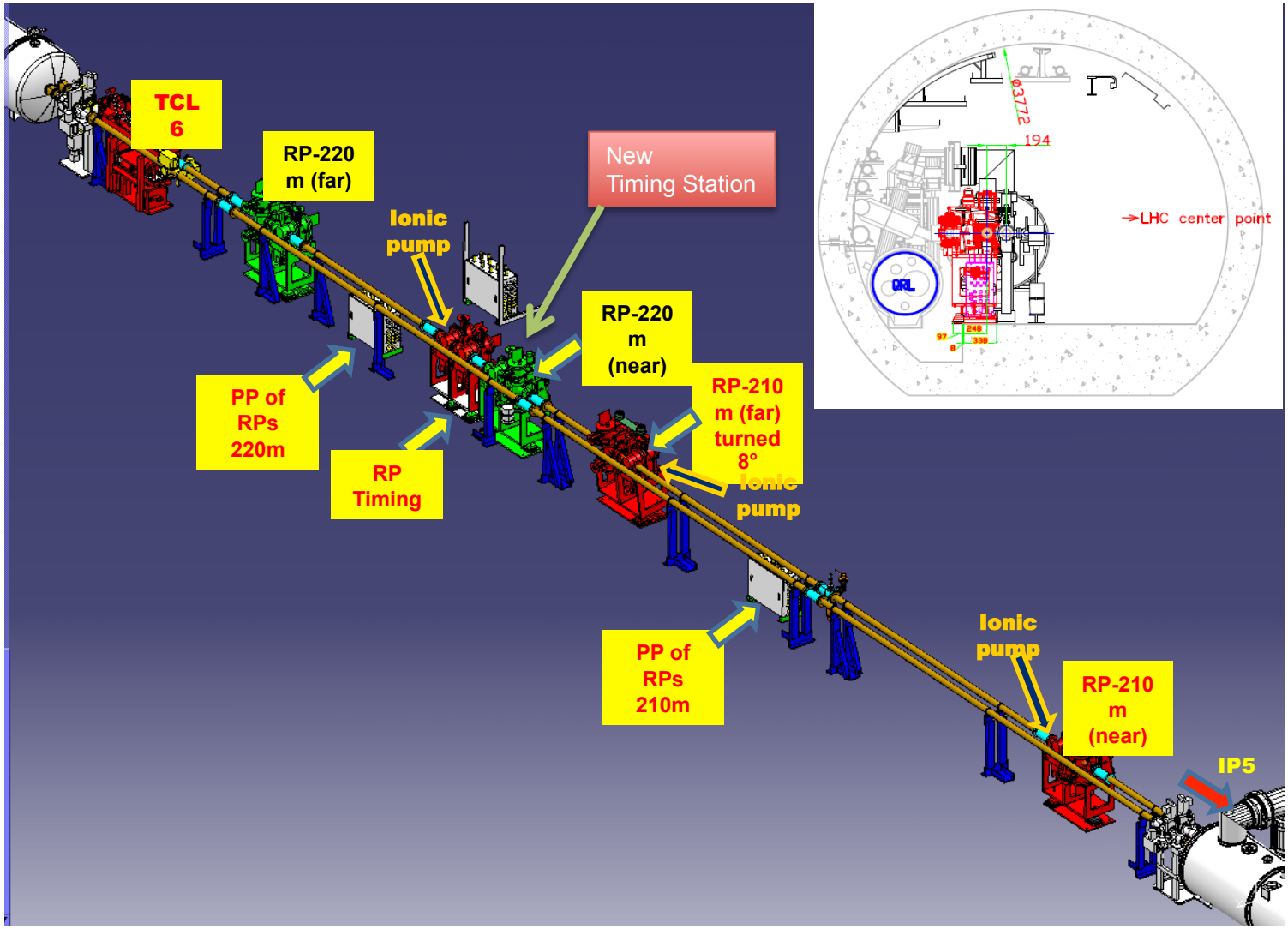
- CT-PPS: Anomalous Quartic Couplings:
  - γγ
  - WW
  - Zγ
- Standard model
  - tt
- CT-PPS: Central- Exclusive-diffractive jet production
- CT-PPS: missing/escaping mass



$$\Delta\eta_{1,2} = -\ln \xi_{1,2}, \quad M^2 = \xi_1 \xi_2 s$$



Roman Pots stations



Totem Pisa/Siena in 2020

- PPS
  - Production ad test of new Hybrids
  - Preassembling of 4 mechanical packages
- New T2
  - design and production of the interface mezzanine (block diagram ready)
  - Mechanics and electronics box preparation
  - Integration tests in CMS

Richieste per servizi

- Nessuna richiesta per officina meccanica
- Nessun supporto in sezione per elettronica (facciamo riferimento al personale di Siena).

Composizione del gruppo

	%		
Bossini	0		*Fellow CERN*
Bottigli	60		*P.O.*
Lami	0		*Primo Ricercatore*
Scribano	0		*P.O.*
Delogu	10		
Turini	100		*Ricercatore Universitario*
Lorenzo Pagliai			*Laureando Magistrale*
Dottorando?			
Cecchi	50		*Tecnologo*

1.7 FTE Ricercatori
0.5 FTE Tecnologi