

**THE CERN LARGE HADRON COLLIDER: ACCELERATOR AND EXPERIMENTS**

# The TOTEM Experiment at the CERN Large Hadron Collider

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## The TOTEM Collaboration

**ABSTRACT:** The TOTEM Experiment will measure the total pp cross-section with the luminosity-independent method and study elastic and diffractive scattering at the LHC. To achieve optimum forward coverage for charged particles emitted by the pp collisions in the interaction point IP5, two tracking telescopes, T1 and T2, will be installed on each side in the pseudorapidity region  $3.1 \leq |\eta| \leq 6.5$ , and Roman Pot stations will be placed at distances of  $\pm 147$  m and  $\pm 220$  m from IP5. Being an independent experiment but technically integrated into CMS, TOTEM will first operate in standalone mode to pursue its own physics programme and at a later stage together with CMS for a common physics programme. This article gives a description of the TOTEM apparatus and its performance.

**Keywords:** Gaseous detectors; Solid state detectors; Particle tracking detectors; Analogue electronic circuits; Data acquisition circuits; Data acquisition concepts; Detector control systems; Digital electronic circuits; Electronic detector readout concepts; Electronic detector readout concepts; Front-end electronics for detector readout; Modular electronics; Optical detector readout concepts; Trigger concepts and systems; VLSI circuits; Detector cooling and thermo-stabilization; Detector design and construction; Overall mechanics design.

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