

Large Hadron Collider produces first physics results

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(PhysOrg.com) -- The first paper on proton collisions in the CERN Large Hadron Collider (LHC) - designed to provide the highest energy ever explored with particle accelerators - is published online this week in the *European Physical Journal C*.

On 23 November 2009, during the early commissioning of the CERN (European Organization for Nuclear Research) LHC - which was built in the circular tunnel of 27km circumference previously used by the Large Electron-Positron collider (LEP) - two counter-rotating [proton](#) bunches were circulated concurrently for the first time in the machine, at the LHC injection [energy](#) of 450 GeV per beam.

A total of 284 collisions were recorded by the ALICE experiment and

immediately reconstructed and analyzed. The researchers determined the average number of charged particles emitted perpendicular to the beam direction, known as ‘pseudorapidity density’. Their aim was to compare their results with previous measurements of proton-antiproton collisions at the same energy, and to establish a reference for comparison with future measurements at higher LHC energies.

The paper by the ALICE collaboration, which brings together authors from 113 research institutes, describes the experimental conditions in detail, as well as the main features of the ALICE detector systems used for the analysis.

The results obtained are consistent with earlier measurements of proton-antiproton interactions at the same energy. They also compare with model calculations.

Dr. Jürgen Schukraft from CERN and ALICE spokesperson said: “This important benchmark test illustrates the excellent functioning and rapid progress of the LHC accelerator, and of both the hardware and software of the ALICE experiment, in this early start-up phase. LHC and its experiments have finally entered the phase of physics exploitation.”

More information: Alice Collaboration (2009). First proton-proton collisions at the LHC as observed with the ALICE detector: measurement of the charged particle pseudorapidity density at $\sqrt{s} = 900$ GeV. European Physical Journal C, [DOI:10.1140/epjc/s10052-009-1227-4](https://doi.org/10.1140/epjc/s10052-009-1227-4)

A Large Ion Collider Experiment. For more information on the ALICE experiment, see: aliceinfo.cern.ch/Collaboration/index.html

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