

Welcome to CERN



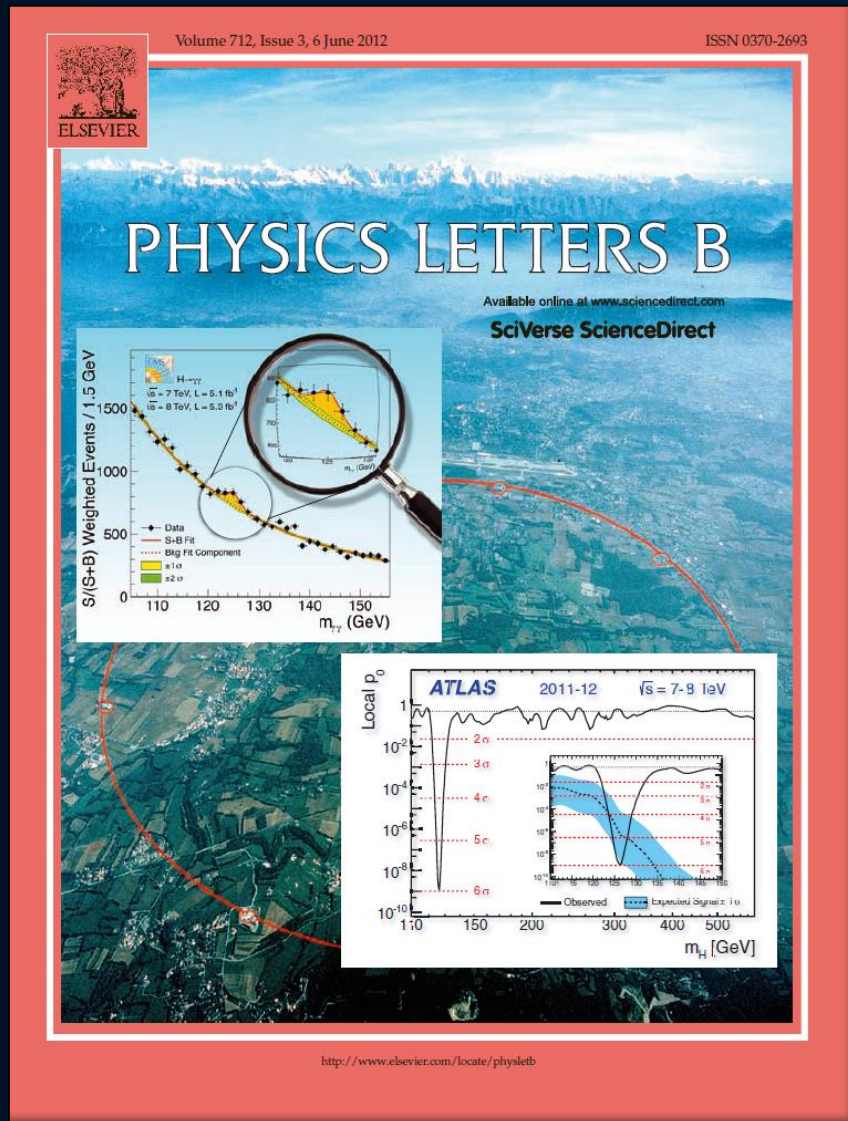
Introduction to the AFF-CCS thematic days

« The LHC: first results and perspectives »

Introduction to the AFF-CCS thematic days: «The LHC: first results and perspectives»

- **Discovery of a Higgs boson in 2012**
 - Result of 3 years of an intensive physics campaign.
 - Today, CERN and its accelerators and experiments are in the spotlight.

The highlight of a remarkable year 2012



Introduction to the AFF-CCS thematic days: «The LHC: first results and perspectives»

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- **The LHC and its detectors**
 - The largest application of superconductivity and cryogenics in the world.
 - 23 km of superconducting magnets, 150 t of helium (of which 80 t superfluid), 120 t of ultra-pure liquid argon, 160 kW of cooling capacity equivalent at 4.5 K including 20 kW at 1.8 K.
 - Implementation of innovative technologies to fulfil the required performance.

Introduction to the AFF-CCS thematic days: «The LHC: first results and perspectives»

- **CERN, LHC and AFF**
 - In 2008, AFF-CCS thematic days took place at CERN; they were dedicated to the design, the construction and the commissioning of the different LHC systems.
 - These new thematic days focus on the results obtained after the first physics runs and on the medium- and long-term perspectives of developments, consolidations, upgrades and studies of future projects in the framework of the European strategy for high-energy physics, presently being updated.
- **First results** and associated **consolidations** for:
 - The detectors ATLAS and CMS
 - The LHC operation and protection
 - The LHC superconducting magnets and associated bus-bar circuits
 - The LHC cryogenic system
 - The beam impact on the cryo-magnetic systems

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- **LS1** and next **physics run** challenges
 - From 4 to 6.5, then to 7 TeV operation
 - Integrated luminosity from today $\sim 30/\text{fb}$ to $\sim 3000/\text{fb}$ in 2030(?)
- Perspective in the framework of the **European strategy**:
 - Upgrade in luminosity of LHC (HL-LHC project) with the construction and installation of new high-luminosity insertion.
 - Studies for future projects at the high-energy frontier.
 - Development of new superconducting materials and cables.
 - Development of high-field magnets and high-gradient RF cavities.