

# High-performance Signal and Data Processing: Challenges in Astro- and Particle Physics and Radio Astronomy Instrumentation



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## The long journey to the Higgs boson and beyond at the LHC

Since three years the experiments at the Large Hadron Collider (LHC) investigate particle physics at the highest collision energies ever achieved in a laboratory. Following a rich harvest of results for Standard Model (SM) physics came in 2012 the first spectacular discovery, by the ATLAS and CMS experiments observing a new, heavy particle which is most likely the long-awaited Higgs boson. The latest results with the full data sets accumulated over the first three-year running period of the LHC will be presented, including recent refined measurements on Higgs properties. Other, far-reaching results can be reported for exploratory new physics searches like Supersymmetry (SUSY), Extra Dimensions, and the production of new heavy particles.

However, with this recent discovery of a heavy scalar boson the exciting journey into unexplored physics territory, within and beyond the SM, has only just begun at the LHC. Besides the first results and the future prospects, the talk will also touch on the motivation, history and the challenges of the whole LHC project, as well as on the fruitful collaboration with the South African teams.

**Primary author:** Dr JENNI, Peter (CERN)

**Presenter:** Dr JENNI, Peter (CERN)