

Large Hadron Collider to run at 4 TeV per beam in 2012

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Large Hadron Collider. Image courtesy of CERN.

(PhysOrg.com) -- CERN today announced that the Large Hadron Collider will run with a beam energy of 4 TeV this year, 0.5 TeV higher than in 2010 and 2011. This decision was taken by CERN management following the annual performance workshop held in Chamonix last week and a report delivered today by the external CERN Machine Advisory Committee (CMAC). It is accompanied by a strategy to optimise LHC running to deliver the maximum possible amount of data in 2012 before the LHC goes into a long shutdown to prepare for higher energy running. The data target for 2012 is 15 inverse femtobarns for ATLAS and CMS, three times higher than in 2011. Bunch spacing in the LHC will remain at 50 nanoseconds.

“When we started operating the LHC for [physics](#) in 2010, we chose the

lowest safe [beam energy](#) consistent with the physics we wanted to do,” said CERN’s Director for Accelerators and Technology, Steve Myers. “Two good years of operational experience with beam and many additional measurements made during 2011 give us the confidence to safely move up a notch, and thereby extend the physics reach of the experiments before we go into the LHC’s first long shutdown.”

The LHC’s excellent performance in 2010 and 2011 has brought tantalising hints of new physics, notably narrowing the range of masses available to the Higgs particle to a window of just 16 GeV. Within this window, both the [ATLAS](#) and CMS experiments have seen hints that a Higgs might exist in the mass range 124-126 GeV. However, to turn those hints into a discovery, or to rule out the Standard Model Higgs particle altogether, requires one more year’s worth of data. The LHC is scheduled to enter a long technical stop at the end of this year to prepare for running at its full design [energy](#) of around 7 TeV per beam.

“By the time the LHC goes into its first long stop at the end of this year, we will either know that a Higgs particle exists or have ruled out the existence of a Standard Model Higgs,” said [CERN](#)’s Research Director, Sergio Bertolucci. “Either would be a major advance in our exploration of nature, bringing us closer to understanding how the fundamental particles acquire their mass, and marking the beginning of a new chapter in particle physics.”

The schedule announced today foresees beams back in the LHC next month, and running through to November. There will then be a long technical stop of around 20 months, with the [LHC](#) restarting close to its full design energy late in 2014 and operating for physics at the new high energy in early 2015.

Provided by CERN

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