# Meeting the Higgs hunters

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With CERN's Large Hadron Collider (LHC) now being fired up after its winter shutdown, physicists at the Geneva lab are gearing up for the first signs of the Higgs boson -- the never-before-seen particle that is one of the LHC's main goals.

But how will physicists at the LHC know for sure when they have seen the Higgs? Physicists have narrowed down the range within which the Higgs could lie, yet being sure of a discovery will be far from easy.

Tommaso Dorigo, a member of the Compact Muon Solenoid (CMS) collaboration, which along with ATLAS is one of the two main experiments at the LHC, writes two state-of-play features exclusively for March's *Physics World* about life at the collider.

The first examines what motivates the LHC's researchers to sit awake eagerly taking data through the small hours of the night, while the second feature discusses the potential discoveries that could be worth a future Nobel prize.

Dorigo is a research scientist at Padova University and author of the blog A Quantum Diaries Survivor (which describes particle-physics news for non-experts).

With the LHC set to run for two solid years until the end of 2012 at a total energy of 7 TeV before a year-long upgrade, the scene is now set for the discovery of the Higgs boson -- the final piece of the Standard Model of particle physics.

As Dorigo describes, the data are about to start arriving in droves. "The gigantic effort of machines and brains that converts hydrogen atoms into violent proton-proton collisions, and then turns these into data analysis graphs, is surprisingly seamless and remarkably fast."

However, many physicists are excited by the possibility that the LHC will find more than just the Higgs. They are also hoping to see new phenomena, including "supersymmtery" and "extra dimensions", that would point to the world being even richer than the Standard Model would suggest.

Yet Dorigo himself is cautious. Finding the Higgs -- and nothing else -- "would be", he writes "a triumph of theory and experiment alike, but researchers who work on ATLAS and CMS would doubtless see the glass as being half empty".

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