

Looking Forward to Moriond

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Abstract

The LHC has ended its three-year long physics run this week and is now finishing off with some quench tests. It will take nearly two years for the collider to be upgraded so that it can work at a higher energy of 12.5–13 TeV. But the fun is not quite all over yet. In just in a few days of time we should start to see the first of the final results from proton physics run that ended in December 2012.

Key Words: Moriond, LHC, shutting down, upgrade, CMS, ATLAS, CERN.



The LHC has ended its three-year long physics run this week and is now finishing off with some quench tests. Tomorrow (Feb. 16, 2013) morning the beams will be dumped for the last time for

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nearly two years while the collider is upgraded so that it can work at a higher energy of 12.5 – 13 TeV.

But the fun is not quite all over yet. In just over two weeks time we should start to see the first of the final results from proton physics run that ended in December 2012. The event to watch is the Electro-Weak section of the Moriond Meeting that opens on the 2nd March. The schedule has not yet been published but when it is you should see it at [this link](#). The following week they will hold the Moriond QCD meeting whose schedule is now available at [this link](#). There will be a quick summary of the Higgs searches which I presume will have already been revealed the week before.

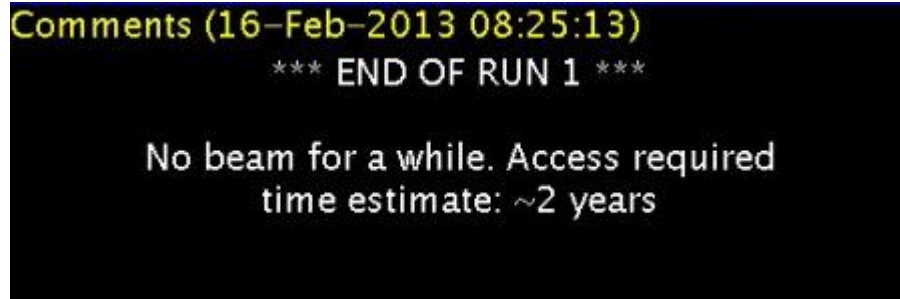
What we expect to see is an update for all the Higgs decay channels from both ATLAS and CMS. Remember that we have seen all the results for 5/fb @ 7TeV + 13/fb @ 8TeV, except that CMS choose not to publish the diphoton result because it was smaller than expected. This means that the public values for the diphoton cross-section are currently subject to a selection bias that needs to be put right. The hope is that we will get full results at something like 5/fb @ 7TeV + 20/fb @ 8TeV, In other words we will have 40% more data for most channels and about 75% more for the diphoton channel. We know that all channels other than diphoton are perfectly in line with the standard model Higgs while the diphoton channel cross-section is a bit too large. However, we need to remove the CMS selection bias before we can get excited about it.

In addition to the cross-sections we can hope for an update to the tests of spin parity on the Higgs boson. This is the final step required before CERN will be happy to declare that the Higgs-Very-Like-Boson is indeed the Higgs-Boson so that Nobel prizes can be handed out. It is unlikely that the individual results from CMS and ATLAS will be quite sufficient. These tests do not need a 5-sigma significance because they are property measurements rather than discoveries. I think they will settle for 3 or 4-sigma but this will require the combination of CMS and ATLAS data.

The ATLAS and CMS collaborations have had plenty of time to analyse their results and have kept them under wraps with no rumours leaking out yet. This may mean that they are keeping them “blind” until the last-minute. If that is the case it will probably mean that there is not time to do an ATLAS+CMS official combination for Moriond. Unofficial combinations of the channel cross-sections can be done quickly by hand but the spin-parity is more subtle so there will be one final Higgs cliff-hanger until the summer.

Normally the biggest HEP conference of the year is either the European EPS-HEP conference or the ICHEP conference. These normally alternate in a two-year cycle but this year an extra ICHEP conference in Switzerland has been laid on. **(UPDATE: It turns out that this is not an official ICHEP conference. Same committee appears to be organising over 1000 conferences this year. Do not register,)** The EPS-HEP conference looks legit and will be in [Stockholm](#). Please always check before paying conference fees.

Update: 16-Feb-2013



See Mike Lamont's final "run 1" report in the [CERN bulletin](#).

References

1. <http://blog.vixra.org/2013/02/15/looking-forward-to-moriond/>