News

LHC Update: Last Proton Run & New Luminosity Record Plus Seminar Watch

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Abstract

This news article contains LHC updates for the period of September 1, 2011 to September 30, 2011 plus a seminar watch which appeared in viXra Log at http://blog.vixra.org.

Key Words: LHC, update, last proton run, luminosity record.

September 2, 2011: LHC Update: Last proton run begins with better squeeze

The final proton physics run for 2011 is starting after the latest technical stop, and the plan is to go for a squeeze of beta* = 1m in place of the 1.5m used so far this year. This may mean it takes a little longer to get back up and running at full pace because of the change in the beam parameters, but once they are back to former bunch numbers, emittence and intensity, the luminosity should pass 3.6/nb/s compared to the previous 2.4/nb/s record.

Further luminosity increases are possible by increasing bunch intensity again and I have seen 5/nb/s suggested as the target, but as always this will depend on how well the machine runs. We have seen it run supersmoothly for a week only to be followed by a week of long cryogenic outages, so I am going to give up on predicting total luminosities until it runs smoothly all the time, maybe.

However there will be eight weeks for this run and best performance has been about 400/pb per week, so make your own guesstimate.

Update: See also report at quantum diaries

September 5, 2011: Seminar Watch

All the main summer conferences have come and gone but ATLAS and CMS are already sitting on about 2.5/fb of data with most published results using only 1/fb – 1.6/fb, so when will we next get an update?

The latest Higgs search results used about 1.6/fb in most important channels with some exceptions. ATLAS used 2.3/fb for the ZZ → 4l channel but only 1.08/fb in the important diphoton channel. CMS updated only the cut-based analysis for the dominant WW → lνlν channel with the best MVA based analysis limited to 1.09/fb. The potential therefore clearly exists to significantly improve the sensitivity for Higgs searches, so when will they do it?

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If you follow the viXra log science calendar you will already have noticed that two previously scheduled LHC seminars now have titles. In one weeks time on 13th September CMS will present "Higgs Searches with CMS". Then on 20th September ATLAS brings us "Diboson Higgs Searches at ATLAS". I have no idea how much new data if any will be revealed but with so many presentations already delivered at conferences and workshops I don't think there would be much point to these if they did not add something new. Then again, I have been caught out before.

One more Higgs workshop has popped up entitled "Higgs Days at Santander 2011" on 19th-23rd September with yet more discussion about combinations and implications. All the important people will be there. Remember that the Higgs combination promised for Lepton-Photon 2011 never materialized except in the form of a leaked early version that closely matched my unofficial combinations. Will an official version finally be allowed out or will theorists have to continue to rely on their own sketches? Keep watching, the next installment in this gripping story is coming up.

Update 15-Sep-2011: A special seminar for tomorrow entitled just "Seminar DG" was scheduled at short notice last week and cancelled at even shorter notice today. Was this to be a special announcement by Rolf-Dieter Heuer the CERN director general? An anonymous comment on Resonaances suggests it was about some 6.1 sigma anomaly: A rumour or a prank? If anyone knows what it was really about please do tell.

Update 20-Sep-2011: Neither of the Higgs seminars discussed any new data beyond that shown at Lepton-Photon 2011. The Santander workshop is proceeding with no slides being posted online so far. We are waiting for the OPERA neutrino seminar of Friday where the growing rumour says they will report the discovery of tachyonic neutrinos.

September 9, 2011: New luminosity record marks great start for LHC run

The Large Hadron Collider has logged a new luminosity record with 2.57/nb/s in ATLAS and 2.69/nb/s in CMS beating the previous figure of 2.4/fb/s.

It is just one week since the start of the final proton physics run for 2011 and already they have returned to colliding the current maximum of 1380 bunches per beam. This run is using a better squeeze of beta*=1.0 meters which should be enough to increase luminosity by 50%.

Further records can therefore be anticipated on subsequent runs as emittance and bunch intensity are brought back to former levels.

To have reached this point so quickly after the end of the technical stop is a good sign for the collider. After previous stops it has typically taken two weeks to iron out problems and return to previous luminosities. The change in the squeeze could have required collimator settings to be adjusted but luckily the old settings have proved more or less sufficient, avoiding delays.

This final run has seven more weeks to go with everyone anxious to see as many inverse femtobarns as possible added to the 2.7/fb already delivered. The increased luminosity and good stability (so far) are good signs that a high total is achievable for 2012 to give good prospects for seeing clear signs of the Higgs boson or other new physics by November.