News

LHC Update: 8 TeV Collisions Started & 1/fb Delivered

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Abstract

This news is adapted from viXra log (http://blog.vixra.org) and contains LHC updates through April 27, 2012.

Key Words: LHC update, 8 TeV, collision.

March 30, 2012: 8 TeV collisions Started

Today the Large Hadron Collider smashed protons at 8 TeV for the first time beating last years energy of 7 TeV. Physics runs will begin in about a weeks time. This year they have set an agressive target of 15/fb at this energy. Last year they exceeded predicitons by a factor of five but we should not expect the same again this year. Reaching 15/fb will be a great result and anything more will be spectacular.

April 15, 2012: 1/fb Delivered

During the last two weeks while I have been away the LHC has made a rapid start to its 2012 run. Peak luminosities are already around 4.5/nb/s in CMS although it is hard to be sure how accurate this is since they have not yet had time to do the scans required for proper calibration. This exceeds last year's records already. About 0.6/fb has already been delivered and is now increasing rapidly. Stability and efficiency is looking very reasonable at this early stage.

Update 20-Apr-2012: According to CMS the LHC has now delivered over 1/fb this year. The ATLAS figure is a fair bit lower and we won't know who is right until the recent Van de Meer scans have been analysed. The milestone was reached thanks to the Machine Development break being reduced by one day. Paul Collier from beam operations has siad that there is still a little scope to increase the bunch intensity from 130 billion to about 150 billion. This could give as much as 33% more luminosity. With these figures they should have no trouble collecting about 1/fb per week and there are 20 weeks of proton physics left after the technical stop next week.
There is now good hope for some preliminary results at the new higher energy of 8 TeV during conferences scheduled for the next few months, with high expectations for the big ICHEP conference in July.

Update 18-Apr-2012: The LHC operations have now reached the maximum bunch numbers of 1380 per beam given the current parameters. This means that it is now fully up to speed and

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should run like this for the rest of the 2012 run. Progress towards this point has been very smooth and has taken just three weeks since first collisions.
If operating efficiency stays as good as this for the rest of the year they will have no trouble meeting their stated targets. Luminosity peaked at 5.6/nb/s in CMS. This may increase a little if they try a little more bunch intensity but there is not much room for improvement, so this years run will be very different from last year when the luminosity was continually increasing throughout the year. (I am assuming they wont go for something crazy like improving the squeeze or switching to 25ns spacing).

After one more day of running the first Machine Development and Technical Stop will interrupt data collection for about 8 days. If tomorrow goes well they could reach the first inverse femtobarn before the stop.

References

1. http://blog.vixra.org/2012/03/30/lhc-starts-8-tev-collisions/

2. http://blog.vixra.org/2012/04/15/lhc-update/