

Measurement of the top quark pair production cross section in 13 TeV proton-proton collision data in the lepton+jets final state with the ATLAS detector

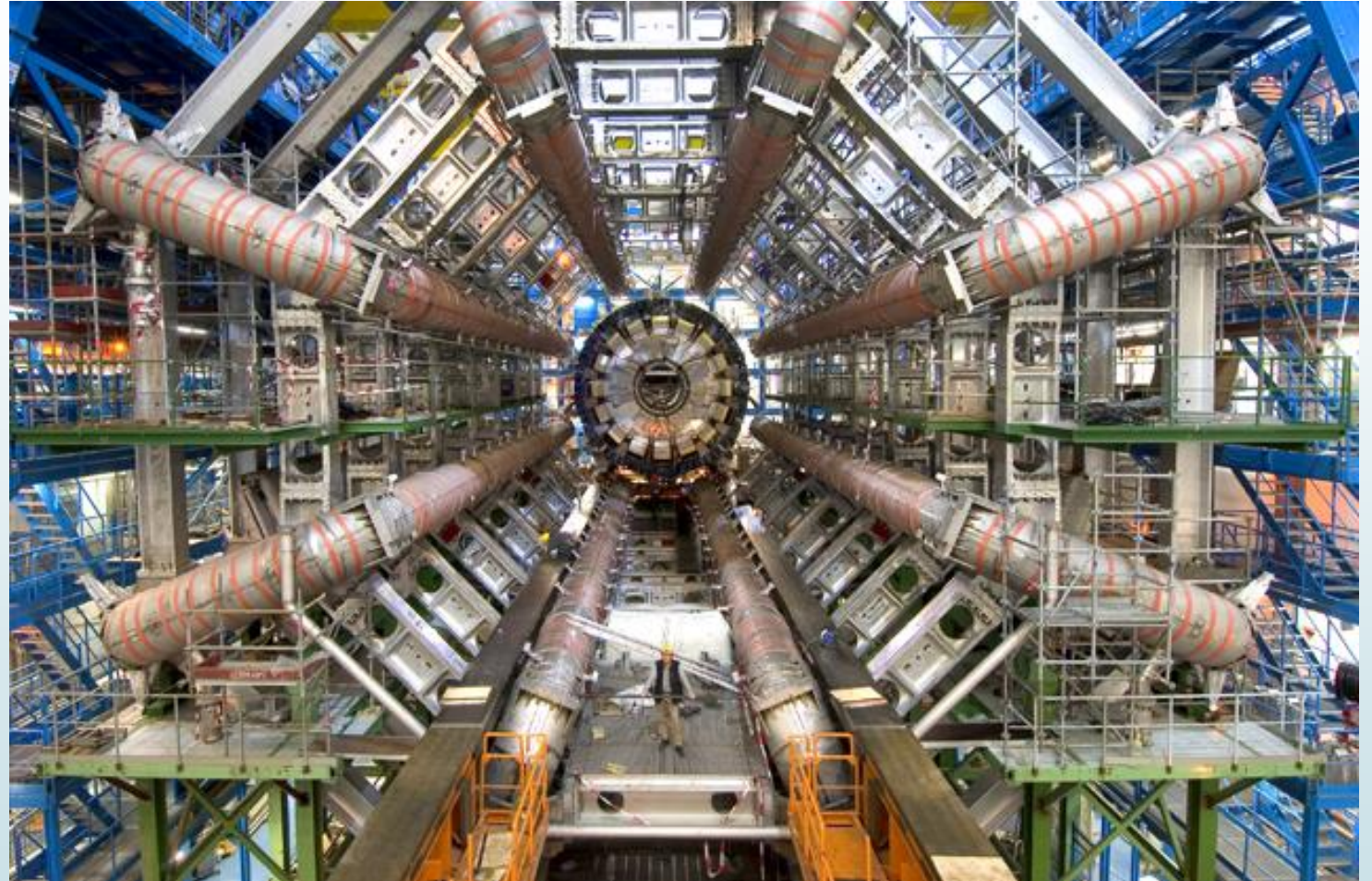
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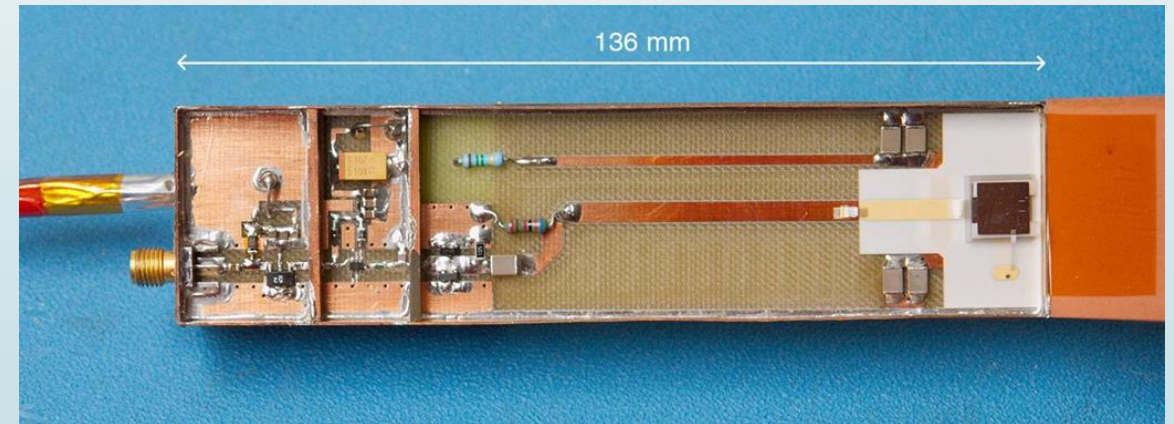
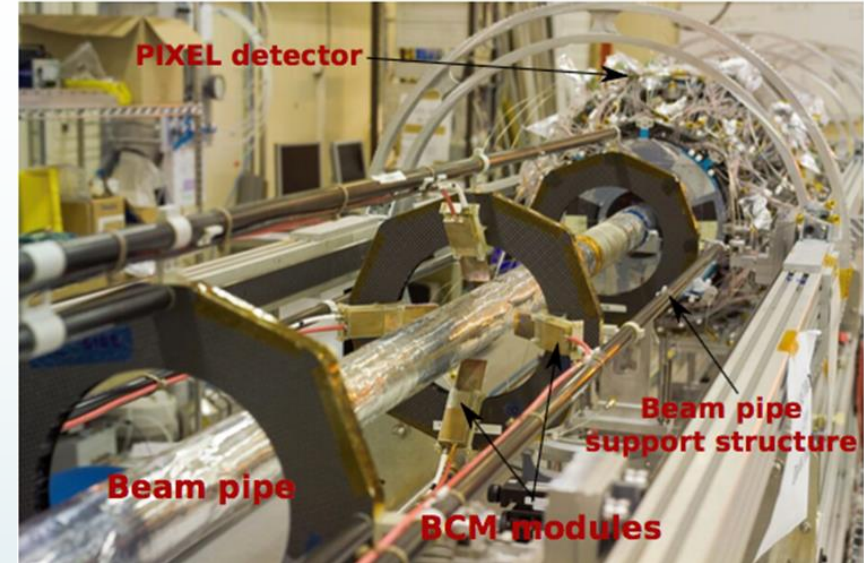
- ▶ Studies top quark production at LHC and precision measurements of its properties
- ▶ Top quarks form the background for many new physics searches
- ▶ Cross section measurement informs the overall modeling of the top quark



http://cdn.arstechnica.net/Science/March10/Atlas_detector.jpg

BCM Sub-Detector

- ▶ ATLAS Diamond Beam Conditions Monitor
- ▶ Monitors collision/background rate:
 - ▶ Abort Beam if losses are large
 - ▶ Provide bunch-by-bunch luminosity measurement
- ▶ Provides uncertainty in luminosity to all ATLAS measurements



Measure $t\bar{t}b\bar{a}r$ Cross Section and Reduce Systematic Uncertainty in Luminosity

- Select $t\bar{t}b\bar{a}r$ events, for use in measuring cross section, with a likelihood-based kinematic fitting technique
- Check if there is a difference between kinematics of 8TeV, widely used now, and 13TeV resolution function parameters for use in $t\bar{t}b\bar{a}r$ selection
- One of the bigger uncertainties in $t\bar{t}b\bar{a}r$ cross section measurement is due to luminosity uncertainty
 - Try to understand different sources of luminosity uncertainty and reduce them if possible

