Top quark physics at the LHC with the CMS detector

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Declaration

I declare that the work in this dissertation was carried out in accordance with the Regulations of the University of Bristol. The work is original except where indicated by special reference in the text and no part of the dissertation has been submitted for any other degree. Any views expressed in the dissertation are those of the author and in no way represent those of the University of Bristol. The dissertation has not been presented to any other University for examination either in the United Kingdom or overseas.

Signed:. . . . . Date:. . . . . .

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1. Introduction

2. Theoretical background

2.1 Standard Model

Yet to be written...

3. The LHC and the CMS detector

3.1 The Large Hadron Collider

The LHC [1] is currently the largest and the most powerful particle accelerator ever built. It is installed in the 26.7 km tunnel that was originally constructed for the LEP accelerator in the 1980s. The tunnel lies at a depth of 45 m to 170 m underground between the Jura mountain and the Lake Geneva, being a main part of the CERN accelerator complex which is shown on fig. 3.1.

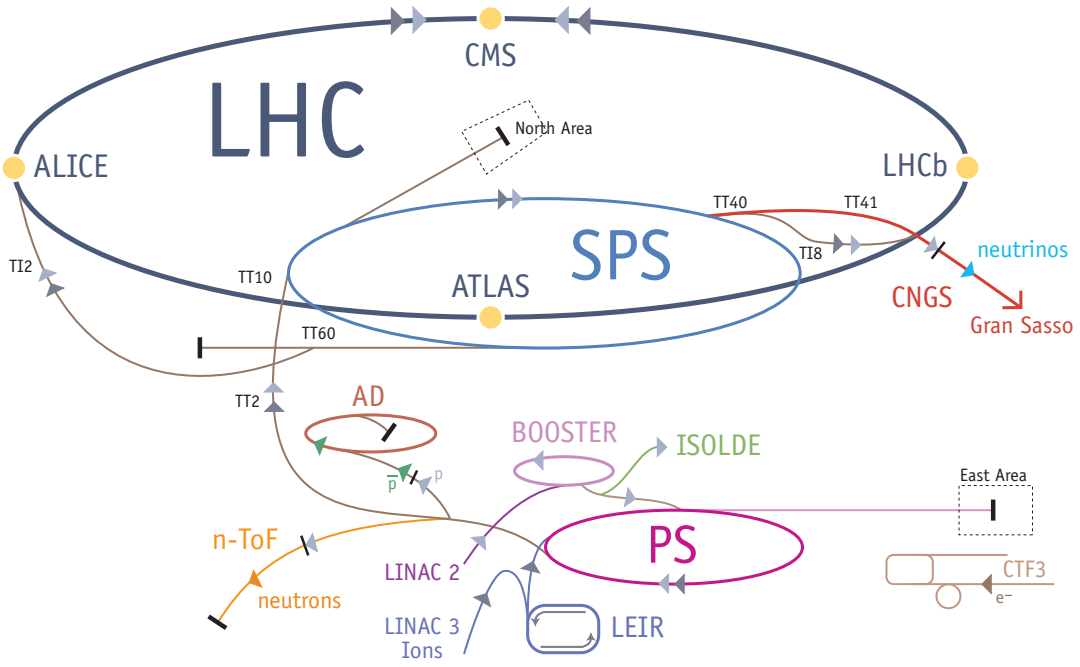

Figure 3.1: CERN accelerator complex

The machine is designed to accelerate proton beams and provide collisions at a centre of mass energy of $\sqrt{s} = 14$ TeV.

3.2 The CMS Detector

The CMS detector is described elsewhere. [2]

3.2.1 Tracking

... and some more ...

3.2.2 Calorimetry

... and some more ...

3.2.3 Muon Systems

... and some more ...

4. High level trigger development for Top Physics

5. Top Quark mass measurement

6. Differential cross section measurement

7. Conclusions

References

[1] L. Evans and P. Bryant. LHC Machine. *JINST*, 3(08):S08001, 2008. 3

[2] The CMS Collaboration. The CMS experiment at the CERN LHC. *JINST*, 3(08):S08004, Aug 2008. 4