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ATLAS Tau Trigger: from design challenge to first tests with cosmics

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The ATLAS tau trigger is a challenging component of the online event selection, as it has to apply a rejection of 10ˆ6 in a very short time with a typical signal efficiency of 80%. Whilst in the first hardware level narrow calorimeter jets are selected, in the second and third software levels candidates are refined on base of simple but fast (second level) and slow but accurate (third level) algorithms. In these two levels, the data from various subdetectors are analysed, however the overall data volume transported through the system (both input subdetector data and output trigger output) has to be minimised. The requirements of the tau trigger together with measured performance during ATLAS cosmics run will be presented.

Triggering on tau leptons is a particularly challenging task, as the signature characteristics are not much different from the overwhelming QCD background. Advanced multi-variate optimisation techniques help to find cut based criteria, which are suitable for usage at trigger level. However, the procedure will be repeated on data. First steps in this direction done in the commissioning of the first and second levels are discussed as well as preparations for fast commissioning with first LHC data.

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