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Trigger Selection Software for Beauty physics in ATLAS

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The unprecedented rate of beauty production at the LHC will yield high statistics for measurements such as CP violation and Bs oscillation and will provide the opportunity to search for and study very rare decays, such as B→ ⊠⊠ .The trigger is a vital component for this work and must select events containing the channels of interest from a huge background in order to reduce the 40 MHz bunch crossing rate down to 100-200 Hz for recording, of which only a part will be assigned to B-physics. Requiring a single or di-muon trigger provides the first stage of the B-trigger selection. Track reconstruction is then performed in the Inner Detector, either using the full detector, at initial luminosity, or within Regions of Interest identified by the first level trigger at higher luminosities. Based on invariant mass, combinations of tracks are selected as likely decay products of the channel of interest and secondary vertex fits are performed. Events are selected based on properties such as fit quality and invariant mass. We present fast vertex reconstruction algorithms suitable for use in the second level trigger and event filter (level three). We discuss the selection software and the flexible trigger strategies that will enable ATLAS to pursue a B-physics programme from the first running at a luminosity of about 1031 cm-2s-1 through to the design luminosity running at 1034 cm-2s-1.

Submitted on behalf of Collaboration (ex, BaBar, ATLAS)

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