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ATLAS Level-1 Trigger Timing and Monitoring

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The ATLAS detector at CERN's LHC will be exposed to proton-proton collisions at a bunch-crossing rate of 40 MHz. In order to reduce the data rate, a three-level trigger system selects potentially interesting events. Its first level is implemented in electronics and firmware, and aims at reducing the output rate to under 100 kHz. The Central Trigger Processor (CTP) combines information from the calorimeter and muon trigger processors, and makes the final Level-1 Accept (L1A) decision.

The CTP is a central element in the timing setup of the experiment. Several strategies are presented for timing-in the experiment, which is done with respect to the Level-1 trigger, with respect to the experiment, and with respect to the world.

Furthermore, the monitoring of the Level-1 trigger is described. As trigger rates are very sensitive to beam conditions (luminosity, backgrounds) and detector performance (e.g. noisy cells), the Level-1 trigger needs to be carefully monitored, which guarantees correct functioning of the Level-1 trigger system and is vital for correct and meaningful data taking.

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