

Usage of the calorimeter in the LHCb High Level Trigger

The software-based High Level Trigger (HLT) is a fundamental element in the LHCb data taking, since it allows to reduce the rate of events coming from a hardware trigger to a level where they can be processed and studied online. It does so with a very high efficiency in selecting beauty and charm decays, which constitute the core of the experiment physics program.

Radiative B decays are one of the cornerstones of the LHCb Physics program. They present a high transverse momentum photon in the final state, which is used by the trigger in order to achieve a good selection efficiency. In this trigger, the information from the LHCb Electromagnetic Calorimeter (ECAL) plays a crucial role. However, given the limited amount of time available to perform the trigger decision making process, a full reconstruction of the ECAL is not possible at this level, hence the necessity of implementing new strategies in the reconstruction of the ECAL in the HLT. This new approach has drastically increased the calorimeter reconstruction speed at a very small cost in efficiency, allowing the expansion of the LHCb radiative B decays program to many new channels.