Contribution ID: **211** Type: **Oral Presentations**

Scintillating sampling ECAL technology for the LHCb PicoCal

Monday, 4 September 2023 17:10 (20 minutes)

The aim of the LHCb Upgrade II is to operate at a luminosity of 1.5 x 10^{34} cm^{-2} s^{-1} to collect a data set of 300 fb^{-1}. The required substantial modifications of the current LHCb electromagnetic calorimeter due to high radiation doses in the central region and increased particle densities are referred to as PicoCal. A consolidation of the ECAL already during LS3 will reduce the occupancy and mitigate substantial ageing effects in the central region after Run 3.

Several scintillating sampling ECAL technologies are currently being investigated in an ongoing R&D campaign: Spaghetti Calorimeter (SpaCal) with garnet scintillating crystals and tungsten absorber, SpaCal with scintillating plastic fibres and tungsten or lead absorber, and Shashlik with polystyrene tiles, lead absorber and fast WLS fibres.

Timing capabilities with tens of picoseconds precision for neutral electromagnetic particles and increased granularity with denser absorber in the central region are needed for pile-up mitigation. Time resolutions of better than 20 ps at high energy were observed in test beam measurements of prototype SpaCal and Shashlik modules. Energy resolutions with sampling contributions of about 10%/sqrt(E) in line with the requirements were observed. The presentation will also cover results from detailed simulations to optimise the design and physics performance of the PicoCal.

Primary author: ROLOFF, Philipp (CERN)

Presenter: ROLOFF, Philipp (CERN)

Session Classification: A5