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Development and test-beam measurements of LHCb PicoCal modules

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The electromagnetic calorimeter (ECAL) is a key component of the LHCb experiment. To cope with the higher performance requirements imposed by the High-Luminosity LHC (HL-LHC) upgrade, the LHCb ECAL will be upgraded with the new PicoCal design. In the upgrade, novel spaghetti calorimeter (SpaCal) modules will replace the existing Shashlik modules in the central region of the ECAL. These modules are currently under development, with significant contributions from Chinese teams in the LHCb collaboration. This presentation reports the latest progress as of 2025. New SpaCal module prototypes for the PicoCal upgrade have been produced and tested in test-beam campaigns. The module design has been iteratively optimized based on the results of these measurements. The LHCb ECAL upgrade team is preparing for large-scale SpaCal module production during Long Shutdown 3 (LS3), while continuing the development towards the ECAL Upgrade II foreseen for LS4.

Primary author: PAN, Xiaofan (Tsinghua University)

Co-author: Mr YUAN, Zhiyang (Peking University)

Presenter: PAN, Xiaofan (Tsinghua University)

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