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Simulation studies of the Lead-Polyesterene SPACAL prototype for the LHCb ECAL Upgrade II

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The LHC Phase II Upgrade foreseen for 2026 implies multi fold increasing of number of collisions and radiation levels compared to the present LHC conditions. The electromagnetic calorimeter (ECAL) of LHCb experiment requires modernisation due to enlarged radiation doses and high occupancy: replacing shashlik-type modules for the central part by spaghetti-type (SPACAL) calorimeter. Current paper presents results of the material optimisation (fibres diameter and distance between their centres (pitch), absorber material) for lead-polystyrene SPACAL module performed with GEANT4 simulation to satisfy the LHCb requirements in term of energy resolution.

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