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Beam Test Results of the Calorimeter Prototype Based on Lead Tungstate Crystal with SiPM Readout

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Development of high-precision electromagnetic calorimeter prototype featuring the record timing resolution is presented in the report. Significant improvement of timing resolution, compared with electromagnetic calorimeters of the current high-energy experiment, is essential for particle identification. The prototype, based on the ALICE PHOS calorimeter design, is build of PbWO_4 scintillating crystals of $22 \times 22 \times 180 \text{ mm}^3$ size equipped with a dual-channel photodetector Hamamatsu MPPC S14160-6015PS and S14160-6010PS. In addition to signal amplitude measurements, the SiPM readout channel is also used for the time measurements. The time resolution (σ_t) of the prototype, measured at the secondary electron beam at PS, results in $\sigma_t < 200$ ps for electrons of energies $E \geq 1 \text{ GeV}$. The energy resolution of the prototype in the range from 0.5 GeV to 10 GeV is also presented in this report.

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