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Evolution of the Landau Spectral Peak Produced by 50 GeV Protons and 7 GeV Electrons in Si Detector at Rotation of the Detector

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The spectra of ionization loss of 50 GeV protons and 7 GeV electrons in 131 and 300 μm thick silicon detector [1,2] at different alignments of the detector are presented. The thickness of the depleted zone of the semiconductor detector Hamamatsu S3590-18 was 131 μm at 10 V and 300 μm at 100 V power supply. Spectra of ionization loss were measured at different angles of the detector rotation relative to the alignment when the plane of the detector is parallel to the beam axis for both thicknesses. The experiment was performed at accelerator U70 in Protvino (Russia). Possibilities for applications of the effect are discussed.

[1] Shchagin A.V., Shul'ga N.F., Trofymenko S.V., Nazhmudinov R.M., Kubankin A.S. Semiconductor detector with smoothly tunable effective thickness for the study of ionization loss by moderately relativistic electrons. Nuclear Instruments and Methods in Physics Research B 387 (2016) 29–33.
[2] Nazhmudinov R.M., Kubankin A.S., Shchagin A.V., Shul'ga N.F., Trofymenko S.V., Britvich G.I., Durum A.A., Kostin M.Y., Maisheev V.A., Chesnokov Y.A., Yanovich A.A. Study of 50 GeV proton ionization loss by semiconductor detector with smoothly tunable thickness. Nuclear Instruments and Methods in Physics Research B 391 (2017) 69–72.

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