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IONIZATION LOSS FOR MEASUREMENTS OF THE DECHANNELING LENGTH OF ELECTRONS

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A new method for the experimental study of ionization loss of relativistic negatively charged particles moving in a crystal in the channeling regime using a semiconductor surface-barrier detector with smoothly tunable thickness of the depleted layer is proposed. The ionization loss can only be measured in the depleted layer of the detector. The thickness of the depleted layer in a flat semiconductor detector can be smoothly regulated by the value of the bias voltage of the detector. Therefore, the energy distribution of the ionization loss of relativistic particles which cross the detector and move in the channeling regime in the detector crystal can be measured along the path of the particles at variation of the bias voltage of the detector. Thus, the dechanneling length of electrons in a crystalline detector can be measured [1,2]. This project has received funding through the MSCA4Ukraine project, which is funded by the European Union.

1. A.V. Shchagin, G. Kube, S.A. Stokov, W. Lauth. Surface-barrier detector with smoothly tunable thickness of depleted layer for study of ionization loss and dechanneling length of negatively charged particles channeling in a crystal. Preprint, 2022. <http://arxiv.org/abs/2211.01913>
2. S.V. Trofymenko, I.V. Kyryllin. On the ionization loss spectra of high-energy channeled negatively charged particles. Eur. Phys. J. C 80 (2020) 689.

Primary authors: SHCHAGIN, Alexander; Dr STROKOV, Sergey; Dr LAUTH, Werner; Dr KUBE, gero

Presenter: SHCHAGIN, Alexander

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