

Measurement of 1-GeV Electrons Ionization loss Spectra in a CdTe Crystal with a Thickness of 1 mm

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Particle identification systems in accelerator complexes often use detectors that measure the ionization loss by charged particles. In case of using semiconductor detectors, flat Si crystals usually act as an active element (see, e.g., [1]). In the present work the ionization loss of 1-GeV electrons moving in a CdTe crystal are measured. Along with silicon, CdTe crystals are also widely used, for example, for the production of X-ray and gamma-ray detectors.

As a target, we used Amptek XR-100T CdTe electrically cooled X-ray detector with crystal thickness of 1 mm which was installed on the beam of relativistic electrons at the Test Beam Facility TB21 of DESY [2]. The energy resolution of the detector is about 830 eV at X-ray energy 59.5 keV emitted from ²⁴¹Am. The measured spectra of 1-GeV electrons ionization losses in 1-mm thick CdTe crystal contain a peak with the energy of about 620 keV and the width of about 200 keV. Properties of the observed spectra are discussed.

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References

- [1] R.M.Nazhmudinov et al. // Nucl. Instrum. Methods B, 2017, vol. **391**, p. 69.
- [2] R.Diener et al. // Nucl. Instrum. Methods A, 2019, vol. **922**, p. 265.

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