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PS1-10: Cherenkov Radiation from 255 MeV Electrons in a Diamond Crystal

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Unless it's long history and successful applications in detector physics, many fundamental properties of Cherenkov radiation from different types of relativistic particles still are not studied in detail, see e.g. [1-3] and references therein. Here, we report on recent first experiment on Cherenkov light measurements from 255 MeV electrons at SAGA-LS accelerator facility [4]. The target used was 50 micrometers-thick diamond crystal and the band-pass filter allowed transmission of Cherenkov light with $\lambda \sim 500$ nm (FWHM). At definite inclination angle, the Cherenkov light can be extracted to 90 degrees from the beam direction. The CCD camera was focused on the crystal. The first experiment showed that the Cherenkov light intensity detected by CCD camera depends on the inclination angle, with a sharply-defined maximum. It agrees with our calculations, taking account of the Fresnel reflection and transmission coefficients of diamond.

References

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