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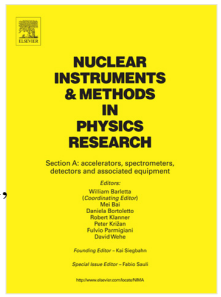

Diffracted diffraction radiation and its application to beam diagnostics

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Diffracted diffraction radiation and its application to beam diagnostics

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Abstract

We present theoretical considerations for diffracted diffraction radiation and also propose an application of this process to diagnosing ultra-relativistic electron (positron) beams for the first time. Diffraction radiation is produced when relativistic particles move near a target. If the target is a crystal or X-ray mirror, diffraction radiation in the X-ray region is expected to be diffracted at the Bragg angle and therefore be detectable. We present a scheme for applying this process to measurements of the beam angular spread, and consider how to conduct a proof-of-principle experiment for the proposed method.

Keywords: Beam diagnostics, Diffracted diffraction radiation, Linear collider, Angular divergence, Crystal, X-ray mirror

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