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Diffraction radiation from periodical structures as a source of X-rays

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A theoretical analysis of the X-ray radiation emitted at the interaction of an ultra-relativistic particle with periodical structures is given. Two types of periodical target are considered: a thin crystalline plate and a diffraction grating consisting of strips. For the first case the analogous of parametric X-ray radiation in the geometry of diffraction radiation is explored. For the diffraction grating consisting of separate strips the Smith-Purcell radiation is investigated, including the coherence effects in the bunch radiation.

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