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Coherent X-Ray Radiation Produced by Microbunched Beams in Amorphous and Crystalline Radiators

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A review on the coherent X-ray bremsstrahlung (CXBR), X-ray transition (CXTR), resonance transition (CXRT), diffraction (CXDR), channeling (CXCHR), parametric (CXPXR) and crystalline undulator (CXCUR) radiation produced by microbunched beams passing through crystalline radiators without the accompanying SASE beams of X-ray FELs is given. Formulas for the spectral and angular distributions as well as the total number of photons of these radiations are derived and numerically studied. It is discussed the possibility of observing of these types of radiation and their application for the study of the parameters of the electron beam microbunching which is important for the effectiveness of XFELs and for production of additional beams of intense monochromatic X-ray beams.

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