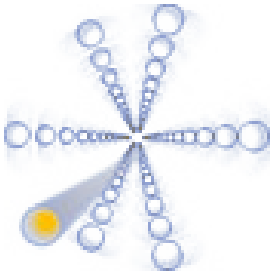

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Diagnostics of Polycrystals Using Polarization Bremsstrahlung from Relativistic Electrons in Backscattering Geometry

Monday, 6 October 2014 17:30 (15 minutes)

Polarization bremsstrahlung (PB) appears as a result of scattering of a relativistic particle Coulomb field on atoms. The PB spectrum contains Bragg coherent peaks when the particle moves in a structured medium. The position of the peaks is determined by the distance between crystallographic planes, which makes it possible to determine the parameters of the lattice similarly to XRD methods. The spectral width and position of the peak are determined by the angle between the particle propagation direction and the direction of PB observation. The width of the peak has a minimal value at about 1-10eV in the case when the PB signal is detected in the opposite direction to the direction of particles velocity. This circumstance allows measuring the parameters of the lattice with accuracy better than 0.1%.
The presented work presents the results of PB spectra measurements in backscattering geometry at interaction of a 7MeV electron beam with Al, Ni, Cu, Nb, Mo, Ag and W polycrystalline foils. The results show the possibility to use PB to develop a new energy dispersive method for diagnostics of the atomic structure of the medium.

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