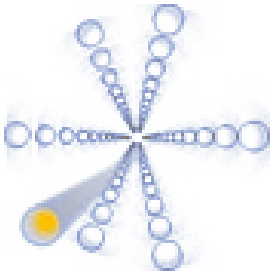

Contribution ID: **65** Type: **Poster**

PS1-07: Simulation of Positron Energy Spectra Generated by Axial Channeling Radiation of GeV Electrons in a Thick Tungsten Single Crystal

Monday, 6 October 2014 17:00 (1h 30m)

Positron production based on the generation of channeling radiation by relativistic electrons channeled along the <100> axis of a W crystal and the subsequent conversion of radiation into e+e−pairs in an amorphous tungsten target is described. Electron dechanneling is considered by solving of the Fokker-Planck equation which describes the passage of axially channeled electrons through a thick single W crystal. The calculation takes into account the diffusion in the transverse energy and angular momentum due to multiple scattering by electrons and thermal vibrations of nuclei. Diffusion coefficients and characteristic dechanneling length in W is given and the dechanneling function obtained as the result of numerical solution of the Fokker-Planck equation. The trajectories, velocities and accelerations of axially channeled electrons are obtained by solving the classical equation of motion. In the framework of classical electrodynamics, the spectral-energy distribution of radiation is obtained from the Fourier transforms of realistic electron trajectories, velocities and accelerations within the W crystal. The calculations of channeling radiation and dechanneling are carried out by means of our Mathematica codes. The conversion of the calculated radiation into e+e−pairs in an amorphous W target has been simulated by means of the GEANT4 package. Positron energy spectrum resulting from the conversion of CR generated in the <100> W radiator is presented and compared with the (100) W planar radiator.

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Session Classification: PS: Poster Session