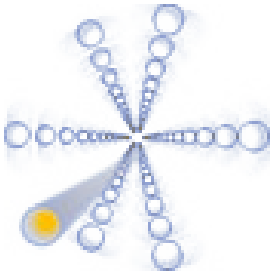

Contribution ID: **155** Type: **Invited talk**

Channeling and Radiation of Ultra-Relativistic Electrons and Positrons in Linear, Bent and Periodically Bent Crystals as Seen from Simulations with MBN Explorer

Tuesday, October 7, 2014 2:30 PM (30 minutes)

We report results of simulation of axial and planar channeling of electrons, positrons and muons in straight [1] and periodically [2, 3] bent Si crystals. The simulations of trajectories of channelled projectiles with accounting for the all-atom interactions have been performed by solution of the classical relativistic equations of motion using newly developed module of the universal MBN Explorer software package [4].

The efficient algorithms of particle trajectories simulation implemented in MBN Explorer has allowed us to describe planar and axial channeling and radiation processes for different type of charged particles and crystals (of different kind and shape) occurring at different energies. In these simulations we have analysed the particle dechanneling lengths, spectral and angular distributions of radiation emitted in the straight, bent and periodically bent crystals. These simulations elucidate all the elementary events of particle propagation through the crystal that contribute to the overall beam propagation and radiation effects.

The calculation of the spectra as well as the numerical analysis of channeling conditions and properties (acceptance, dechanneling length, etc) have been carried out for different beam energies in the rage between 855 MeV and 10 GeV. The obtained results are in a good agreement with the results of the performed experiments and provide predictions for the experiments on electron and positron channeling ongoing at SLAC [5].

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