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PS1-16: Electron and Positron Channeling in Straight and Periodically Bent Axial Si Channels

Monday, October 6, 2014 5:00 PM (1h 30m)

In the talk the results of simulations of axial channeling of electrons and positrons in straight and periodically bent Si crystals will be reported and compared with the planar channeling case [1-3]. 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 results of simulations were analysed in order to calculate parameters of channeling such as dechanneling length, fraction of channeling particles and its evolution with crystal length. The application of full atomistic approach for calculation of trajectories allows direct comparison of axial and planar cases of channeling. It was shown, that the dechanneling length in axial case is few times smaller than in planar case due to higher local density of atoms along the trajectories of projectiles.

The case of axial channeling of positrons in periodically bent crystal was also studied. It was shown, that the dechanneling length depends strongly on both direction of a beam and direction of crystal bending. This effect can be also described by analysis of the shape of a surface of an average potential energy of a projectile in a channel.

References

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