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About Multiple Scattering of High Energy Protons in Crystal Deflectors

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The process of multiple scattering of high energy protons in a silicon crystal at its amorphous orientation was studied by simulation of proton trajectories in the model of binary collisions and by simulation of the sequences of proton collisions with atoms when their impact parameters are randomly and uniformly distributed on the symmetry cell for a given crystallography direction. The value of the deflection dispersion obtained by the simulation is in a good agreement with the experiment and allows to describe well the process of multiple scattering in channeling conditions. Different number of proton collisions with atoms are realized along the same crystal length for different crystal orientations. However, the change of the collision number is compensated by the corresponding change of the mean square of deflection angle in a single collision. Therefore, multiple scattering is the same for different crystal orientations. The generator of multiple scattering for amorphous crystal orientations was proposed.

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