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Multiple scattering, volume capture and volume reflection of positive charged particles in bent single crystals

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An analytical model for the volume capture of high-energy positive particles into planar (111) channels of a silicon single crystal is proposed. Under the assumption that the cause of particle capture is multiple scattering, the capture probability is found. Channeling of trapped particles is also considered. Comparison of calculations with experiment is performed. Results of the study will be useful in the realization of multicrystal devices for collimation and extraction of beams on modern and future accelerators.

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