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Calculation of charge-changing cross sections of ions or atoms colliding with fast ions using classical trajectory method HARRISON EDWARD MEBANE, ARIEL SHNIDMAN, IGOR D. KAGANOVICH, RONALD C. DAVIDSON¹, Princeton Plasma Physics Laboratory — Evaluation of ion-atom charge-changing cross sections is needed for many accelerator applications. A classical trajectory Monte Carlo simulation has been used to calculate ionization and charge exchange cross sections. For benchmarking purposes, an extensive study has been performed for the simple case of hydrogen and helium targets in collisions with various ions. To improve computational efficiency, several integration methods, including Runge-Kutta with adaptive stepsize and Bulirsch-Stoer with Stoermer's Rule, were compared. Despite the fact that the simulation only accounts for classical mechanics, the calculations are comparable to experimental results for projectile velocities in the region corresponding to the vicinity of the maximum cross section.

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