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Robust methods for calculation of the charge-changing cross sections of ions or atoms by fast ions[1] THOMAS BENDER, IGOR D. KAGANOVICH, EDWARD A. STARTSEV, RONALD C. DAVIDSON, Princeton Plasma Physics Laboratory — Ion-atom charge-changing cross sections are needed in many applications employing the propagation of fast ions through matter. The validity of two most frequently used approximations, the Born approximation and classical trajectory approximation, has been studied by comparing the results of simulations with available experimental data [1]. A hybrid method has been developed by combining the two approaches in the regions of impact parameters in which they are valid, and summing the results to obtain the total cross section [2]. As a result, typical computations take only few minutes. The hybrid approach has been tested by comparison with available experimental data and full quantum mechanical calculations. A new scaling formula for the ionization and stripping cross sections of atoms and ions by fully stripped projectiles has also been developed [1]. [1] I. D. Kaganovich, E. A. Startsev and R. C. Davidson, "Formulary and scaling cross sections for ion-atom impact ionization," http://arxive.org/abs/physics/0407140 ; to be published in New Journal of Physics (2006). [2] Igor D. Kaganovich, et. al., Nucl. Instr. and Methods A **544**, 91 (2005).

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Igor Kaganovich
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