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Relativistic calculations of differential ionization cross sections: Application to antiproton-hydrogen collisions

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A new relativistic method based on the Dirac equation for calculating fully differential cross sections for ionization in ion-atom collisions is developed. The method is applied to ionization of the atomic hydrogen by antiproton impact, as a non-relativistic benchmark. The fully differential, as well as various doubly and singly differential cross sections for ionization are calculated. Several discrepancies in available theoretical predictions are resolved. The future extension of the method towards supporting experiments at GRYRING@ESR is discussed.

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