Abstract Submitted
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Electron scattering from atomic gallium: data for plasma physics modeling[1] D.V. FURSA, I. BRAY, CAMS Curtin University — Accurate electron-atom collision data is of primary importance for plasma physics modeling. Often the number of required transitions is very large and realistically can only be provided by theoretical calculations of electron-atom collisions. With development of sophisticated scattering methods, such as Convergent Close Coupling (CCC) method and R-matrix (RM) method, accurate collision data can be obtained for large number of scattering systems. Recent developments in CCC and RM methods allow for accurate calculations of target atoms which are strongly affected by relativistic effects. Gallium is one such target, with the ground state being a P-state that is strongly affected by spin-orbit interaction resulting in fine-structure splitting of 0.1 eV. We have performed fully-relativistic CCC calculations of electron scattering from gallium and compared with the available experimental and theoretical data. We find large discrepancies with the collision data used for the modeling of gallium-iodine positive column discharge plasma, which recently attracted substantial attention as a possible candidate for designing nontoxic (mercury-free) light sources.

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