

Graphical Abstract

Relativistic effects in light atoms can be conveniently calculated through the first-order perturbation theory. For one-electron systems confined in plasma environments modeled by static screening potentials, the relativistic energy corrections vary along with the screening parameter. The present work presents high-precision calculations of the first-order relativistic corrections for H-like ions in three types of model plasmas and examines the applicability of the perturbation theory with respect to the nuclear charge and screening parameter.

