Abstract Submitted
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Electron collisions with cesium atoms – benchmark calculations and application to modeling an excimer-pumped alkali laser[1] OLEG ZATSARINNY, KLAUS BARTSCHAT, Drake University, NATALIA BABAEVA, MARK KUSHNER, University of Michigan — The B-spline R-matrix (BSR) with pseudostates method [1] was employed to describe electron collisions with cesium atoms. Over 300 states were kept in the close-coupling expansion, including a large number of pseudostates to model the effect of the Rydberg spectrum and the ionization continuum on the results for transitions between the discrete physical states of interest. Predictions for elastic scattering, excitation, and ionization for incident energies up to 200 eV are presented and compared to previous results [2,3] and experimental data. Our data were used to model plasma formation in the excimer-pumped alkali laser, XPAL, operating on the $Cs(6^2P_{3/2,1/2} \rightarrow (6^2S_{1/2})$ (852 nm and 894 nm) transitions. At sufficiently high operating temperature, pump power, and repetition rate, plasma formation in excess of $10^{14} - 10^{15}\,cm^{-3}$ occurs. This may reduce laser output power by electron collisional mixing of the upper and lower laser levels [4].

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