

Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Electron Impact Excitation and Ionization of Atomic Oxygen

SWARAJ TAYAL, Clark Atlanta University, OLEG ZATSARINNY, Drake University — The B-spline R-matrix with pseudostates method has been employed to treat electron collisions with atomic oxygen. The excitation, cross sections have been calculated for transitions between all $2s^22p^4$ and $2s^22p^33l$ ($l = 0,1,2$) states of oxygen in the energy range from threshold to 150 eV. The present calculations differ from numerous previous studies as we included a large number of pseudostates in the close-coupling expansion to represent continuum and excitation-autoionization states. The pseudostates have a major influence on the theoretical predictions, especially at intermediate energies, where many of the excitation cross sections are reduced significantly. Our calculated cross sections are in better agreement with available experimental data. Detailed treatment of ionization cross sections for the ground and metastable states will also be provided. Our calculation is the first non-perturbative calculation of ionization cross sections. We included all important physical effects including short-range correlation in the target states and long-range polarization effects in the scattering system.

Swaraj Tayal
Clark Atlanta University

Date submitted: 28 Jan 2016

Electronic form version 1.4