

GEC20-2020-000103

Abstract for an Invited Paper  
for the GEC20 Meeting of  
the American Physical Society

### **Overview of Modern Collisional-Radiative Modeling for Plasmas**

YURI RALCHENKO, National Institute of Standards and Technology

Collisional-radiative (CR) modeling represents the most general approach to determination of plasma emission and population kinetics parameters away from equilibrium conditions. It is heavily based on utilization of large sets of atomic data and thus puts forward demanding requirements on the quality of the data. CR modeling allows reliable treatment for low- and high-density cold and hot plasmas, non-Maxwellian electron energy distribution functions, plasma effects on atomic structure and spectra, external radiation fields, opacity effects, and other physical phenomena. I will present a broad overview of the modern techniques for generation of accurate atomic data for CR modeling, give numerous examples of CR codes and their fundamental principles, and highlight applications of CR modeling for calculation of plasma spectra under diverse conditions, covering multi-order ranges of particle temperature and densities.