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Session 4A: V: On-Demand Poster Session - Available throughout DAMOP Meeting

8:00 AM, Monday, June 3, 2024

Abstract: 4A.00004 : Enhancement of database NORAD-Atomic-Data for atomic processes in plasma*

← Abstract →

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We report recent enhancements of the online atomic database at the Ohio State University, NORAD-Atomic-Data, that provides various parameters

for radiative and collisional atomic processes dominant in astrophysical plasma. NORAD stands for Nahar Osu RADiative. The database belongs to the data sources, especially for the latest works, of the international collaborations of the Opacity Project and the Iron Project. The contents of the database are calculated values for energies, oscillator strengths, radiative decay rates, lifetimes, cross sections for photoionization, electron-ion recombination cross sections and recombination rate coefficients. We have recently expanded NORAD-Atomic-Data with several enhancement as follows. i) We continue to add energy levels, transition parameters,

cross sections for atoms and ions with their publications. ii) Recently added radiative atomic data contains significant amount of transition data for photo-absorption spectral features corresponding to x-ray resonance fluorescence effect, prominent wavelength regions of bio-signature elements, such as phosphorus ions, and emission bumps of heavy elements, such as of lanthanides, that may be created in a kilonova event. We are including iii) collisional data for electron-impact-excitation, iv) experimental data for energies and oscillator strengths for line formation, v) experimental cross sections for photoionization that can be applied for benchmarking and other applications, and vi) introduction of a web-based interactive feature to calculate spectral line ratios at various plasma temperature and density diagnostics, starting with our recently published data for P-II. We present a summary description of theoretical backgrounds for the

computed data and of measurement of high resolution photoionization cross sections at Advanced Light Source of LBNL synchrotron set-up and briefly discuss other set-ups. These additions should make NORAD-Atomic-Data more versatile for various applications.

*Computer facility: Ohio Supercomputer Center