Seminar

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Institute for Plasma Research

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Title: Spectral investigation of multiply ionized silver atoms: Ag III-IV

Speaker: Dr. Ankita Saxena
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Date: 20th September 2024 (Friday)

Time: 03.30 PM

Venue: Online talk: https://meet.google.com/uue-vvhx-kyc

Abstract

Doubly ionized silver (Ag III) [1] and trebly ionized silver (Ag IV) [2] are isoelectronic to Rh I and Ru I and have ground electronic configurations $4d^9$ and $4d^8$ respectively. The spectra employed for the analysis were excited using a triggered spark source and recorded on a 3-m Normal incidence vacuum spectrograph and a 1.5-m Wadsworth spectrograph. The theoretical calculations for the ions were performed by Cowan's Code package [3, 4] based on the Hartree-Fock (HF) method with relativistic corrections. The information regarding the ground and first excited configurations is critically compiled, with some revisions. The present work is an extension of the previous work to establish the energy levels of the configurations $4d^8(5d+6s)$ in Ag III and $4d^7(5d+6s)$ in Ag IV. In our investigation, we used the least square fitting of Slater's parameters to interpret the observed energy level structure. We used LOPT code [5] for optimizing spectral wavelengths to obtain the best energy level values and Ritz wavelengths. The present work includes transition probability values and energy level designations in various coupling schemes (*LS*, *jj*, *jK*). The intensities are reduced to a uniform scale using the Boltzmann plot to get a consistent set of intensities throughout the spectrum.

[1] A. Saxena and T. Ahmad, Revised and Extended Analysis of Doubly Ionized Silver: Ag III. Journal of Quantitative Spectroscopy & Radiative Transfer, 217, 130- 154, 2018.
[2] A. Saxena and T. Ahmad, Spectral analysis of triply ionized silver (Ag IV), Journal of Quantitative Spectroscopy & Radiative Transfer, 254, 2020.
[3] R. D. Cowan, "The Theory of Atomic Structure and Spectra", University of California: Berkeley, CA, USA, 1981.
[4] A. Kramida, Comput. Phys. Commun., 215, 232 and Cowan Code developed for windows-based personal computers. NIST Public DATA Repository, (2018). doi:10.18434/T4/1502500
[5] A. Kramida, The program LOPT for least-squares optimization of energy levels. Computer Physics Communications, 182, 419-434, 2011.