Seminar

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Institute for Plasma Research

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Title:	Spectral Studies of Moderately Ionized Bismuth Atoms: Bi (III-VI)
Speaker:	Dr. Neelam Kumari Arya Aligarh Muslim University, Uttar Pradesh
Date:	06th December 2024 (Friday)
Time:	03:30 PM
Venue:	Join the talk online https://meet.google.com/wcd-retk-kuu

Abstract

Over the past few decades, the spectra of heavy elements, like bismuth, have been measured and extensively analyzed in the vacuum ultraviolet region. Their value has grown in recent years, since data on atomic properties are increasingly employed to interpret the star spectra. The spectral lines of Bi II and Bi III obtained from the Hubble/Goddard Space Telescope demonstrate notable enhancements in chemically peculiar (CP) HgMn stars HR 7775 and χ Lupi. Researchers gain distinct perspectives on the behavior of these celestial bodies by assessing their relative strengths and analyzing the spectral data in relation to the solar photosphere. This provides a comprehensive overview of high-resolution spectra in the context of heavy metal concentrations, offering crucial insights into the geographical and temporal patterns of CP stars. However, to effectively detect and analyze the characteristics of bismuth at spectral resolution, it was necessary to have more precise and extensive atomic data than what was previously available. Our research is mark by the creation of innovative laboratory measurements and hyperfine structure patterns for various ionization states of bismuth within the vacuum ultraviolet range, using a pseudo-relativistic Hartree-Fock approach. This includes a thorough analysis of experimental data on wavelengths and energy levels, as well as theoretical data on transition probabilities and oscillator strengths. Our compilation updates the currently proposed set of atomic data for Bi (III-VI), which originated from compilations dating back to 1930, and includes revisions for direct data entry into the NIST Atomic Spectra Database (ASD), recognized as the world's only source of critically assessed atomic data.