

ELECTRON EXCITATION AND AUTOIONIZATION CROSS SECTIONS FOR ELEMENTS OF CHEMICALLY PECULIAR (CP) STARS: STUDY OF BISMUTH

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Electron impact excitation from the ground state of bismuth atoms has been studied. A beam of electrons was scattered from a beam of atoms and intensity of scattered electrons was measured for scattering angles up to 150° and incident electron energies of 10, 20, 40, 60, 80 and 100eV. Obtained intensities were used for the calculation of relative differential cross sections (DCS). In addition, we recorded energy loss-spectra at different incident electron energies and scattering angles. These spectra were analyzed to determine the energy levels of bismuth atom below and above (autoionization) the first ionization limit.

The apparatus, described earlier [1], was used in the present measurements to record electron energy-loss spectra and to determine direct angular distribution of elastically and inelastically scattered electrons. Spectroscopic data of autoionizing region had been recently published [2].

The presence of bismuth was confirmed in spectra of the chemically peculiar (CP) Hg-Mn stars 73Dra and HR 7775 [3], [4] and more recently in χ Lupi [5]. The obtained results for relative DCS and identified autoionized energy levels of bismuth were analyzed and compared with previous experimental and theoretical data. The connection between our investigations of bismuth and astrophysical measurements are discussed.

Acknowledgements: This work is partly supported by the project MESTD RS OI 171020 and COST Action MP1002.

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