

SPECTROSCOPIC INVESTIGATION OF CHEMICALLY PECULIAR STARS

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Abstract. This review summarizes the results of the spectroscopic and abundance analyses of chemically peculiar (CP) stars belonging to different subgroups: cool pulsational (roAp) and non-pulsational stars, hot magnetic stars, and HgMn stars. The most of present investigations were carried out in collaboration with astronomers from Vienna, Uppsala, and Crimea.

The spectroscopy of CP stars which possess strong magnetic fields typically of the order of few kilogauss is not possible without modern technique. Special synthetic code – **SYNTHMAG**, which takes into account magnetic field in radiation transfer, was developed by N. Piskunov (Uppsala) and was successfully applied to spectroscopic analysis of cool Ap and roAp stars. Based on magnetic synthetic calculations we first could estimate magnetic field modulus in HD 24712, HD 122970, and HD 101065. The last object is a famous Przybylski star – the coolest and the most peculiar object among roAp stars. At present time we performed abundance analysis for 8 out of 31 known roAp stars. Based on recent measurements and calculations of the transition probabilities for rare-earth elements in the second ionization state we identified and measured Pr III and Nd III lines in spectra of all studied roAp stars. For one of them, γ Equ, radial velocity (RV) survey was performed by astronomers from Crimean Astrophysical observatory. We found that Pr III and Nd III lines present the largest amplitudes of RV variations with a photometrical pulsation period. A differential study of RV pulsations together with the photometry gives us a clue to the nature of pulsations in roAp stars.

The second group of our interest are hot magnetic CP stars. Based on the **INVERSE** code written again by N. Piskunov we made Doppler abundance mapping for CU Vir, κ Psc, and 56 Ari.

In a group of HgMn stars our interest is mainly concentrated on spectroscopic binaries with HgMn primaries. We made a complete spectroscopic analysis of four binaries: 112 Her, 46 Dra, α And, and κ Cnc. For κ Cnc we first discovered very weak lines of the secondary star which allowed to obtain more accurate orbital elements and mass ratio. Abundance results show that secondary stars in all four binaries possess some characteristics of metallic-line (Am) stars.