

STARK BROADENING OF SPECTRAL LINES IN CHEMICALLY PECULIAR STARS

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With the development of astronomical observations from space, trace elements can now be identified in stellar spectra. Here, we investigated theoretically the influence of collisions with charged particles on heavy metal spectral line profiles for neutral emitter Te I, singly charged emitters Cr II, Mn II and Au II and doubly charged emitters Cu III, Zn III, Se III, In III and Sn III in spectra of chemically peculiar stars, especially in A stars and white dwarfs. By using the semiclassical perturbation method (Sahal-Bréchet, 1969ab), Stark widths and shifts have been obtained. When it can not be applied in an adequate way, due to the lack of reliable atomic data, modified semiempirical method (Dimitrijević and Konjević, 1980; Dimitrijević and Kršljanin, 1986) was used. For the considered spectral lines, we analyzed our theoretical results with the available experimental and other theoretical data. Also, here we considered the contributions of different collision processes to the total Stark width in comparison with Doppler one.

Cr is one of the most peculiar element in the atmospheres of magnetic chemically peculiar stars. Stark broadening parameters for Cr II spectral lines of seven multiplets belonging to 4s-4p transitions were applied to the analysis of Cr II line profiles observed in the spectrum of Cr-rich star HD 133792. We found that Stark broadening mechanism is very important and should be taken into account, especially in the study of Cr abundance stratification.

References

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