HELIUM IN WOLF-RAYET SPECTRA(*)

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The observation of Helium lines in the near-infrared proved to be a powerfull tool to investigate the Wolf-Rayet stars and more particularly the WN.

Combining new and previous observations of the equivalent widths of HeII λ 10124 and HeI λ 10830, it is possible to empirically divide the presently sampled WNs population within six groups. These are well connected with the "temperature parameter" of the models of Schmutz et al. (1989) and, also, with the classical WN subtypes although the definition of the latters is mainly based on the appearance of NIII, NIV and NV lines (and only very marginally for the latest ones on the aspect of a He I line).

When H is present, the observation of the near infrared lines of the 6-n series of He II, some of them being blended by Paschen emission lines, allows a determination of the H^+/He^{++} ratio. A combination of all the data presently available (optical and near-infrared) indicates that, with one exception (to be confirmed), all the WN8-7 stars have a sizable H content with a tendency towards a stronger H signature in the WN8s relative to the WN7s.

He I lines of the 3 p - nd and 3d - nf series can be strong in the spectra of some WN stars, for example in WR 123. Nevertheless this is not the case in the spectrum of WR 158 and we suggest that the emission we observe at λ 8446 is due to OI. WR 158 being a H rich WN, this OI line could be produced by a fluorescence mechanism induced by Lyβ as it is observed in Be, planetary nebulae, novae, ...

References

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