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Quantitative Spectral Analysis of hot Post-AGB Stars

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Abstract. Post-AGB (PAGB) stars are luminous objects of low and intermediate mass in a final and short stage of evolution in the transition between AGB stars and planetary nebulae (PNe). In this work we present a quantitative spectral analysis of some hot PAGBs based on high resolution spectra. The stellar parameters and chemical composition were obtained from the synthesis of non-LTE spectra.

Keywords. stars: AGB and Post-AGB - stars: abundances - stars: evolution

1. Introduction

Post-AGB objects present a dust envelope formed by intense mass loss during the previous AGB phase. The spectra of PAGB stars show many absorption lines formed in their atmospheres and also emission lines formed in the envelope. Most of PAGB present low to intermediate temperatures with spectral types F-G. However, some PAGB present B-type spectra and are called hot-PAGB stars (Parthasarathy & Pottasch 1986). On the other hand, some OB supergiants with high galactic latitudes and presenting dust envelopes and IRAS colors similar to those of PNe have been identified (Conlon *et al.*, 1992). A possible evolutionary connection between these objects can be tested by comparing chemical abundances for samples of hot-PAGB and halo OB supergiant stars. In this work we present preliminary results for four PAGB stars without any abundance result previously published. These objects are IRAS14331-6435, IRAS17074-1845, IRAS18023-3409 and IRAS17203-1534.

2. Observations

High resolution spectra (R=48000) of the objects have been obtained with FEROS spectrograph coupled to the ESO 2.2m telescope at La Silla (Chile). The spectra cover the wavelenght range 3700 to 9200Å and have S/N $\sim$ 120 at 4500Å.

3. Analysis

The absorption spectra of the sample stars were analyzed in non-LTE using the program SYNSPEC. The synthetic profiles were produced interpolating in the grid of atmospheric models BSTAR2006 (Lanz & Hubeny 2007) that was previously generated with the code TLUSTY (Hubeny & Lanz 1995).

The atmospheric parameters effective temperature T_{eff}, surface gravity log$g$ and the microturbulent velocity ξ were determined simultaneously from the analysis of HeI, OII and NII line profiles. The solution for a given pair T_{eff}, log$g$ and for ξ was chosen

as to have similar abundance values for weak and intermediate lines and to have lower abundance dispersion.

The abundances are determined from the fit of non-LTE theoretical line profiles to the observed spectra. Lines of HeI, NII and OII were fitted independently and the average abundance with the corresponding line-to-line scatter was adopted as the star abundance. Figure 1 shows the abundances for the sample stars relative to Sun.

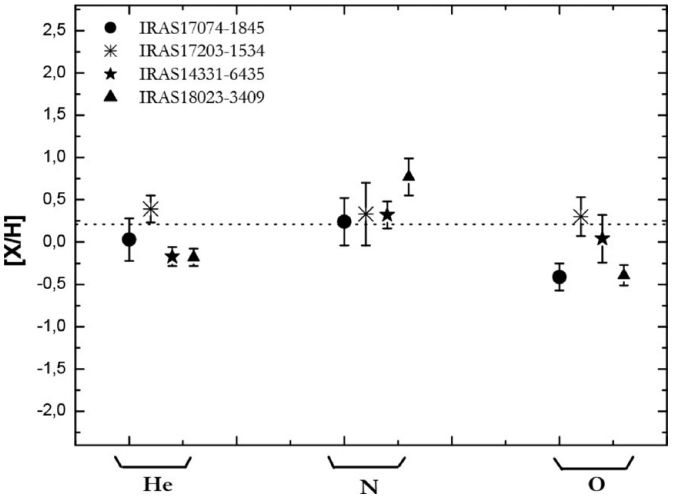

Figure 1. Helium, nitrogen and oxygen abundances relative to Sun (Asplund, Grevesse & Sauval 2006) for the hot Post-AGB stars.

4. Discussion and perspectives

We present preliminary non-LTE abundances based on high resolution spectra for a sample of hot PAGB stars. In continuing this work, we will derive abundances for other elements such as C, Mg, Al, Si and S for the hot PAGB stars. Our next step will be the analysis of the sample of the halo OB supergiants stars. The abundance distributions obtained for these stars and the hot PAGB stars will be compare in the end.

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