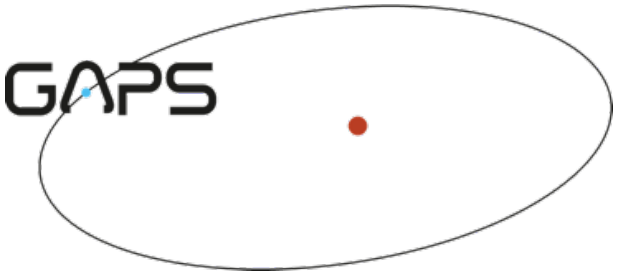

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Atmospheric parameters and chemical composition of YO stars

Wednesday, 6 May 2020 14:30 (15 minutes)

The detailed characterisation of stars is important in many astrophysical fields. In particular, knowing with great precision the atmospheric parameters and chemical composition of planet hosting stars allows to fully characterise exoplanets and address a number of aspects, e.g. the planet-metallicity relation.
In our work, we performed a precise determination of the atmospheric parameters and a detailed chemical analysis of high-resolution spectra of stars observed by the GAPS consortium. The selected targets are intermediate-age stars (< 700 Myr), that have been observed simultaneously in the optical with HARPS-N and in the near infrared with GIANO-B spectrographs at TNG, in GIARPS mode. We analysed the spectra by applying a new method, that exploits the use of titanium lines to derive the atmospheric parameters, in particular surface gravities and microturbulence velocity parameter. The resulting parameters have been used to derive the abundances in the optical and NIR spectra through equivalent width and spectral synthesis methods, respectively. We derived abundances for eleven atomic species: C I, Na I, Mg I, Al I, Si I, Ca I, Ti I, Ti II, Cr I, Cr II, Fe I, Fe II, Ni I and Zn I. Our spectroscopic determination of the atmospheric parameters are in excellent agreement with the initial photometric guesses. We also found a good agreement between the optical and NIR abundances, with all stars having close-to-solar metallicities. The lack of systematic trends between elemental abundances and effective temperatures validates our methods. However, we observed that the coolest stars in the sample, with T < 5400 K, display higher abundances for the ionised species, in particular Cr II, and for high-excitation potential C I lines. On the contrary, carbon abundances derived from CH molecular band at 4300 A, do not display the same behaviour as the optical C I estimates.

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