

The IACOB project. V. Spectroscopic parameters of the O-type stars in the modern grid of standards for spectral classification

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The IACOB and OWN surveys are two ambitious complementary observational projects which have made available a large multi-epoch spectroscopic database of optical high resolution spectra of Galactic massive O-type stars. As a first step in the study of the full sample of (more than 350) O stars surveyed by the IACOB/OWN projects, we have performed the quantitative spectroscopic analysis of a subsample of 128 stars included in the modern grid of O-type standards for spectral classification. We use semi-automatized tools to determine the set of spectroscopic parameters that can be obtained from the optical spectrum of O-type stars. We also benefit from the multi-epoch character of the surveys to perform a spectroscopic variability study of the sample, accounting for spectroscopic binarity and variability of the main wind diagnostic lines. We provide a general overview of the stellar and wind parameters of this reference sample, and updated recipes for the SpT-Teff/log g calibrations for Galactic O-type stars. We evaluate our semi-automatized analysis strategy with ~40 stars from the literature, and find a good agreement. The agreement between the synthetic spectra associated with fastwind best fitting models and the observed spectra is good for most targets, but 46 stars present a particular behavior of the wind diagnostic lines that cannot be reproduced by our grid of spherically symmetric unclumped models. These are potential targets of interest for more detailed investigations of clumpy winds and/or the existence of additional circumstellar components. Last, our variability study has led to the detection of signatures of spectroscopic binarity in 27% of the stars and small amplitude radial velocity variations in the photospheric lines of another 30%. Additionally, 31% of the investigated stars show variability in the wind diagnostic lines.

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