

## Investigation of Cyg OB2 #11(O5 Ifc) by modelling its atmosphere

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### Abstract

We continue the study of O-supergiants belonging to the association Cyg OB2 using moderate-resolution spectra. In this paper we present results of the modelling of the stellar atmosphere of Cyg OB2 #11. This object belongs to the spectral class Ofc, which was recently introduced and is yet small in numbers. Ofc class consists of stars with normal spectra with CIII  $\lambda\lambda$ 4647, 4650, 4652 emission lines of comparable intensity to those of the Of-defining lines NIII  $\lambda\lambda$ 4634, 4640, 4642. We combined new spectral data obtained by the 1.5-m Russian-Turkish telescope with spectra from MAST and CASU archives and determined physical parameters of the wind and chemical composition of the stellar atmosphere using cmfgen code. The estimated nitrogen abundance is lower than one in atmospheres of 'normal' O-supergiants (i.e. O4-6 supergiants without additional spectral index 'n' or 'c') and carbon abundance is solar. Also we find an excess in silicon. We present an illustrative comparison of our modelling results with current Geneva evolutionary models for rotating massive stars. The position on the Hertzsprung-Russell diagram corresponds to the star mass of about 50  $M_{\odot}$  and age about 4.5 Myr. Moreover, we carried out the high angular resolution ( $\sim 0.02$ arcsec) observations on the Russian 6-m telescope aiming to find weaker companions of this star, which did not reveal any. © 2014 Astronomical Society of Australia.

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### Keywords

outflows, stars: atmospheres, stars: early-type, stars: evolution, stars: fundamental parameters, stars: individual: Cyg OB2 #11, stars: winds