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ON THE STELLAR AND WIND PROPERTIES OF MASSIVE STARS IN 30 DORADUS

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Massive stars, with initial masses than 10 solar masses, are powerful cosmic engines that strongly impact their immediate surroundings. Stellar winds and rotation are key parameters in their evolution, affecting the evolution, chemical yields, ionizing photon budget, and the final fate as supernovae and long-duration gamma-ray burst.
Models of their evolution predict the series of morphological states that massive stars pass through before reaching their final fate, therefore studying populations of massive stars is a proven way of testing the outcome of such calculations. In this way, O-type stars are of particular interest as they sample the main sequence phase in the range of 15 Msun to ∼100 Msun, be they dwarfs, giants or supergiants.
We, the VLT-FLAMES Tarantula Survey (VFTS), have obtained multi-epoch optical spectroscopy of over 300 O-type objects in the 30 Doradus (30 Dor) region. It contains the richest population of massive stars in the Local Group and is the best possible laboratory to investigate open questions on the formation and evolution of massive stars. Here we will present the results of the atmospheric analysis of 100 spectroscopic-single O-type stars in the VFTS. We constrain the stellar and wind parameters by combining the non-LTE stellar atmosphere model FASTWIND with a generic fitting algorithm approach.
By confronting the stellar characteristics with evolutionary tracks for single stars we established the evolutionary state, age, and mass, and confront the spectroscopic and evolutionary masses (i.e., mass discrepancy). Finally, the wind-strength of our stars is higher than theoretical predictions. This may be interpreted as an effect of the wind being clumped.

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