

The masses, and the mass discrepancy of O-type stars

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Context. The “mass discrepancy” in massive O stars represents a long-standing problem in stellar astrophysics with far-reaching implications for the chemical and dynamical feedback in galaxies.

Aims. Our goal is to investigate this mass discrepancy by comparing state-of-the-art model masses with model-independent masses determined from eclipsing binaries.

Methods. Using stellar evolution models and a recent calibration of stellar parameters for O-star spectral sub-classes, we present a convenient way to convert observed solar metallicity O star spectral types into model masses, which we subsequently compare to our dynamical mass compilation. We also derive similar conversions for Large and Small Magellanic Cloud metallicities.

Results. We obtain a good agreement between model and dynamical masses, suggesting the long-standing problem of a systematic mass discrepancy problem may have been solved. We also provide error ranges for the model masses, as well as minimal and maximal age estimates for when the model stars are in a given spectral type box.

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Comments:

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