

ODUSSEAS: a machine learning tool to derive effective temperature and metallicity for M dwarf stars

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The derivation of spectroscopic parameters for M dwarf stars is very important in the fields of stellar and exoplanet characterization.

We present our easy-to-use computational tool ODUSSEAS, which is based on the measurement of the pseudo equivalent widths for more than 4000 stellar absorption lines and on the use of the machine learning Python package “scikit-learn” for predicting the stellar parameters. It offers a quick automatic derivation of effective temperature and [Fe/H] for M dwarf stars using their 1D spectra and resolutions as input. The main advantage of this tool is that it can operate simultaneously in an automatic fashion for spectra of different resolutions and different wavelength ranges in the optical.

ODUSSEAS is able to derive parameters accurately and with high precision, having precision errors of 30 K for Teff and 0.04 dex for [Fe/H]. The results are consistent for spectra with resolutions between 48000 and 115000 and S/N above 20.

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