Massive Stars Near and Far
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Astro+: Design, construction, and scientific exploitation of a large-scale massive star spectroscopic database

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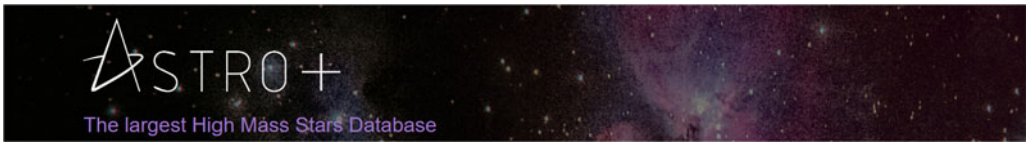
Abstract. Massive stars are the objects that condition the evolution of the interstellar medium by the amount of energy released during their lives and especially by their death as a supernova explosion. All the data provided by the previous and ongoing missions of ground and space telescopes have saturated us with the amount of information, which is no longer easy to process daily by human routines. To this end, we present the development of a massive star spectroscopic interactive database designed for scientific research.

Keywords. Database, Massive-stars, Automatic-programs, parameter-determination.

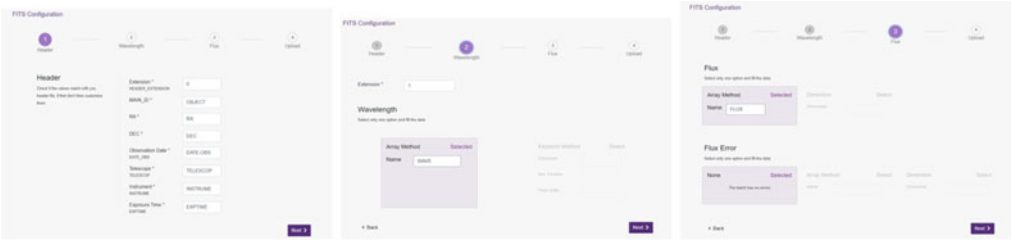
1. Introduction

We have created a web application Astro+, a dedicated massive star spectra storage site, to have a centralised place for all the spectra available from, 1.the users who want to contribute, 2.the data already available and 3.the data coming from the different new missions. Our application is divided into three main parts, the upload, the search and the science modules. Within the first, we find the upload process, where the user will be able to upload spectra in both FITS and ASCII format.



2. Upload method

FITS has different configurations (array, binary data, etc.),and so we allow the user options to set the FITS configuration. On the other hand, the ASCII upload is quite simple, a separate header and spectrum need to be provided, following the standard template required. Once the upload is done, the user can track the upload and correct any errors by using the log we provide. The entered parameters can also be checked, and the user can reprocess the already uploaded file without the need to re-upload the files and then submit the upload for review.



3. Visualization/Search

To inspect the uploaded spectrum, we provide a friendly and easy way to visualize the spectrum, complemented with visual identification using the Aladin API. We add the data from Simbad and Gaia databases through a correlation based on ID or coordinates to check if the star was correctly identified. From Simbad we also adopt the name of the star as the main identification ID to our database.

The search tool,can be used to search through the available spectra in the database by ID, coordinates or by using SQL syntax for more specific star types.

4. Science/AI

By a battery of programs created in Python, based on the best model determination methods (Simón-Díaz & Herrero 2007), (Simón-Díaz et al. 2011), (Simón-Díaz & Herrero 2014) and (Simón-Díaz et al. 2015) on a grid FASTWIND (Santolaya-Rey et al. 1997), (Puls et al. 2005), we can obtain the most critical parameters, such as $V_{\rm rad}$, $V \sin i$, $T_{\rm eff}$ and $\log g$, in a completely automatic way, for early or late massive stars. We are now contrasting preliminary results for Blue/Hot stars with those obtained by (Holgado et al. 2018) from which we are finding errors within the expected, $T_{\rm eff} \sim 1000$[K] and $\log g \sim 0.3$[dex].

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Supplementary material

To view supplementary material for this article, please visit http://dx.doi.org/10.1017/S1743921322003295.

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