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The NuGrid AGB Evolution and Nucleosynthesis Data Set

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Asymptotic Giant Branch (AGB) stars play a key role in the chemical evolution of galaxies. These stars are the fundamental stellar site for the production of light elements such as C, N and F, and half of the elements heavier than Fe via the slow neutron capture process (s-process). Hence, detailed computational models of AGB stars'evolution and nucleosynthesis are essential for galactic
chemical evolution.
In this work, we discuss the progress in updating the NuGrid data set of AGB stellar models and abundance yields. All stellar models have been computed using the MESA stellar evolution code, coupled with the post-processing mppnp code to calculate the full nucleosynthesis. The final data set will include the initial masses $M_{ini}/M_{\odot}$ = 1, 1.65, 2, 3, 4, 5, 6 and 7 for initial metallicities Z = 0.0001, 0.001, 0.006, 0.01, 0.02 and 0.03. Observed s-process abundances on the surfaces of evolved stars as well as the typical light elements in the composition of H-deficient post-AGB stars are reproduced. Additionally, we discuss our new nucleosynthesis results with the inclusion of new nuclear reaction rate, in particular documenting the impact of new ^{22}Ne+α rates on presolar grains, where the description is improved. A key short-term goal is to complete and expand the AGB stars data
set for the full metallicity range. Ejected chemical yield tables are provided for the available models.

Session

Stellar nucleosynthesis

Primary authors: TATTERSALL, Ashley (University of Edinburgh); Dr PIGNATARI, Marco (Konkoly Observatory, Research Centre for Astronomy and Earth Sciences, Eötvös Loránd Research Network (ELKH)); BATTINO, Umberto (University of Hull); Prof. HERWIG, Falk (University of Victoria); DENISENKOV, Pavel (University of Victoria)

Presenter: BATTINO, Umberto (University of Hull)

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