Contribution ID: **59** Type: **Oral**

The importance of the 13C(a,n)16O reaction in Asymptotic Giant Branch stars

Tuesday, 26 June 2018 09:30 (15 minutes)

Low mass Asymptotic Giant Branch stars are among the most important polluters of the interstellar medium. In their interiors, the main component (A>90) of the slow neutron capture process (the s-process) is synthesized, the most important neutron source being the 13C(a,n)16O reaction. I will present a theoretical sensitivity study (with variation up to a factor of two with respect to a reference case), carried out with the FUNS evolutionary stellar code. Variations of the 13C(a,n)16O rate do not appreciably affect s-process distributions for masses above 3 Msun at any metallicity. Apart from a few isotopes, in fact, the differences are always below 5%. The situation is completely different if some 13C burns in a convective environment: this occurs in FUNS models with M<3 Msun at solar-like metallicities. In this case, a change of the 13C(a,n)16O reaction rate leads to non-negligible variations of the elements surface distribution (10% on average), with larger peaks for some elements (as rubidium) and for neutron-rich isotopes (as 86Kr and 96Zr). Larger variations are found in low-mass low-metallicity models, if protons are mixed and burnt at very high temperatures. In this case, the surface abundances of the heavier elements may vary by more than a factor 50.

Primary author: CRISTALLO, Sergio (INAF - OAA)

Co-authors: VESCOVI, Diego (GSSI & INFN Perugia); PIERSANTI, Luciano (INAF - OAA); STRANIERO, Oscar (INAF - OAA)

Presenter: CRISTALLO, Sergio (INAF - OAA)

Session Classification: Stellar contribution: low and intermediate mass stars