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

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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.