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Magnetic mixing in AGB stars and branchings in the s-process

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The nucleosynthesis process involving neutron captures during stellar helium burning, known as the s-process, contributes to roughly half of the elements heavier than iron. As for Asymptotic Giant Branch (AGB) stars, they are major producers of nuclei from Sr to Pb. Despite significant theoretical progress in recent decades, uncertainties persist in AGB models, notably regarding the mechanism responsible for the formation of the so-called ^{13}C pocket, the main neutron source in AGB stars. Here we present recent results from new AGB stellar models considering the effects of mixing induced by magnetic fields, for the first time computed by simultaneously solving the nuclear and burning equations. We show the impact of using different mixing schemes on the branches along the s-process path and discuss the production of the long-living s-only isotope ^{205}Pb in the light of new temperature- and density-dependent weak decay rates of ^{205}Pb and ^{205}Tl.

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