Impact of neutrino flavor oscillations on the neutrino-driven wind nucleosynthesis of an electron-capture supernova

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Neutrino oscillations, especially in light sterile states, are known to affect the nucleosynthesis yields because of their feedback effect on the electron fraction. We perform nucleosynthesis calculations for neutrino-driven wind trajectories from the neutrino-cooling phase of an 8.8 M_sun electron-capture supernova computed in hydrodynamical simulations where sophisticated neutrino transport is applied and discuss the impact of both active-active and active-sterile oscillations. The approach we use in order to investigate the impact of neutrino oscillations on the nucleosynthesis of the considered neutrino-driven wind is similar to what was done in Tamborra et al. (2012), with the important difference that we take into account weak magnetism corrections in the neutrino beta processes as well as the alpha-effect on the Ye evolution, and we investigate a larger set of time slices. For the adopted supernova progenitor, we find that oscillations (also in the sterile state) affect the element formation on a negligible level.
We conclude that neutrino oscillations, also in sterile states, cannot contribute to making the supernova outflows neutron rich enough to activate the r-process.