

## Evolution and final fate of stars in the transition between AGB and Massive Stars

*Monday 10 June 2024 10:20 (20 minutes)*

According to a standard initial mass function, stars in the range 7-12 Msun constitute  $\sim 50\%$  (by number) of the stars more massive than 7 Msun. Despite this, their evolutionary properties, particularly their final fate, remain mostly understudied. In this talk I will present some of the results published in our recent paper, where we discussed in details the evolutionary properties of solar metallicity, non rotating, stars in the range 7-15 Msun, from the pre-main sequence up to the pre-supernova stage or up to an advanced stage of the thermally pulsing phase, depending on the initial mass. Our findings revealed several key points: (1) the 7.00 Msun develops a degenerate CO core and evolves as a classical AGB star; (2) stars with initial mass  $M \geq 9.22$  Msun end their life as core collapse supernovae; (3) stars in the range  $7.50 < M/\text{Msun} < 9.20$  develop a degenerate ONe core and evolve through the thermally pulsing SAGB phase; (4) stars in the mass range  $7.50 \leq M/\text{Msun} \leq 8.00$  end their life as hybrid CO/ONe- or ONe-WD; (5) stars with initial mass in the range  $8.50 \leq M/\text{Msun} \leq 9.20$  most likely achieve the central densities in excess of the threshold value for the activation of the electron capture on  $^{20}\text{Ne}$  before losing the entire H-rich envelope and therefore may potentially explode as electron capture supernovae.

**Primary authors:** CHIEFFI, Alessandro; ROBERTI, Lorenzo (Konkoly Observatory, Research Centre for Astronomy and Earth Sciences); LIMONGLI, Marco (Istituto Nazionale di Astrofisica (INAF))

**Presenter:** ROBERTI, Lorenzo (Konkoly Observatory, Research Centre for Astronomy and Earth Sciences)

**Session Classification:** AGB structure, evolution and nucleosynthesis