MAKE O Ne WD

This test is to show a 1.1 $M_\odot$ oxygen-neon white dwarf created from a 9 $M_\odot$ star. Therefore, this test should be cut off when the luminosity drops below 10^2 $L_\odot$ (`log_L_lower_limit = 2`).

The inlist for this test includes controls that set a uniform rotation frequency (`change_rotation_flag = .true. ; new_rotation_flag = .true.`) of 10% critical frequency (`new_omega_div_omega_crit = 0.1`) for the first ten steps (`set_omega_div_omega_crit_step_limit = 10`).

The test starts by loading a ZAMS model and then evolves it through the main sequence, RGB and AGB periods, until it becomes a oxygen-neon white dwarf. This entire evolution is show in the HR-diagram to the left (figure 1). The red marker denotes the point of most rapid mass loss and the blue marker denotes the end of mass loss. The mass plot to the right (figure 2) shows that this mass loss period is relatively short.

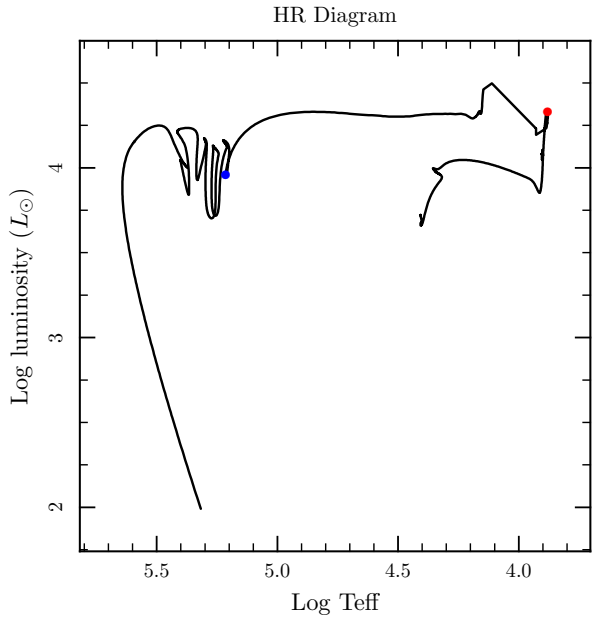

Figure 1: HR-diagram, dots mark beginning and end of mass loss

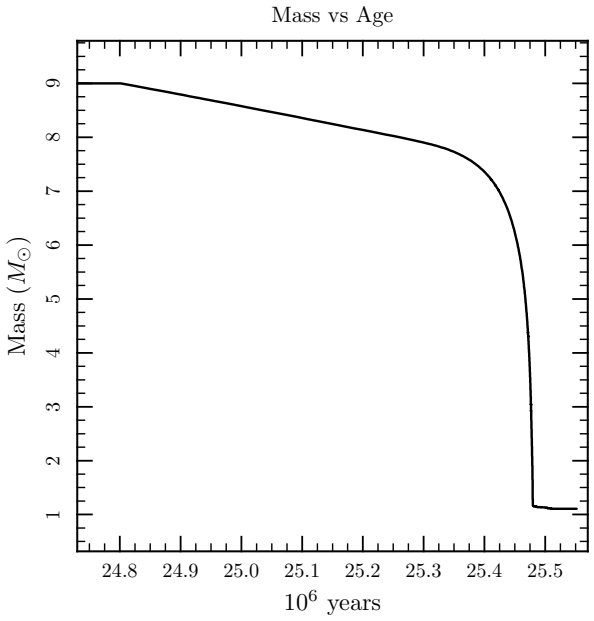

Figure 2: Mass loss period is relatively short

The two burning rate profiles below are taken from the point at the red marker on the HR diagram (figure 1). To the left is a profile of the core(figure 3) and to the right is a profile of the shell just outside the core (figure 4).

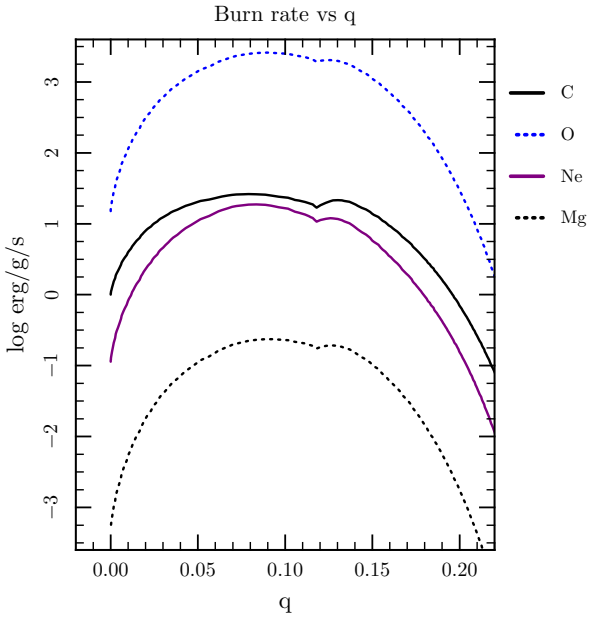

Figure 3: Burning rate profile of core from red dot on HR-diagram

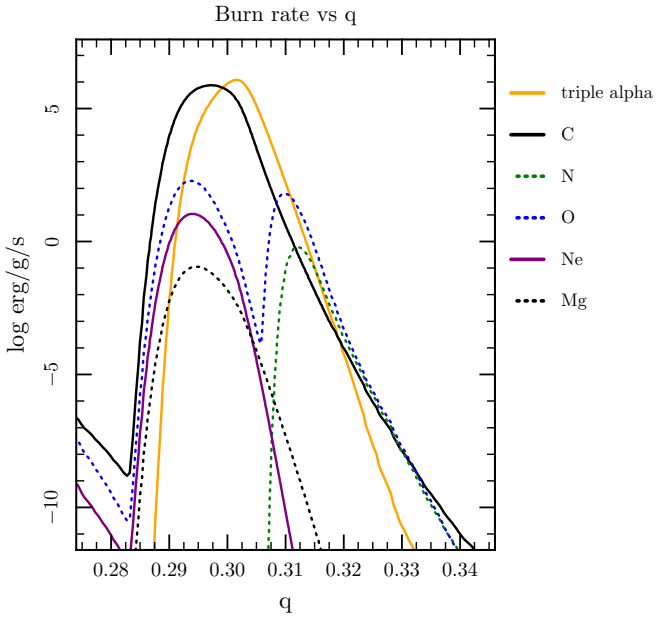

Figure 4: Burning rate profile of shell from red dot on HR-diagram

Below is an abundance profile take from the end of the run (figure 5), with log mass fraction plotted against logxq, where logxq = log(1-q) and q is the fraction of star mass interior to outer boundary of each zone, moving outwards from the core.

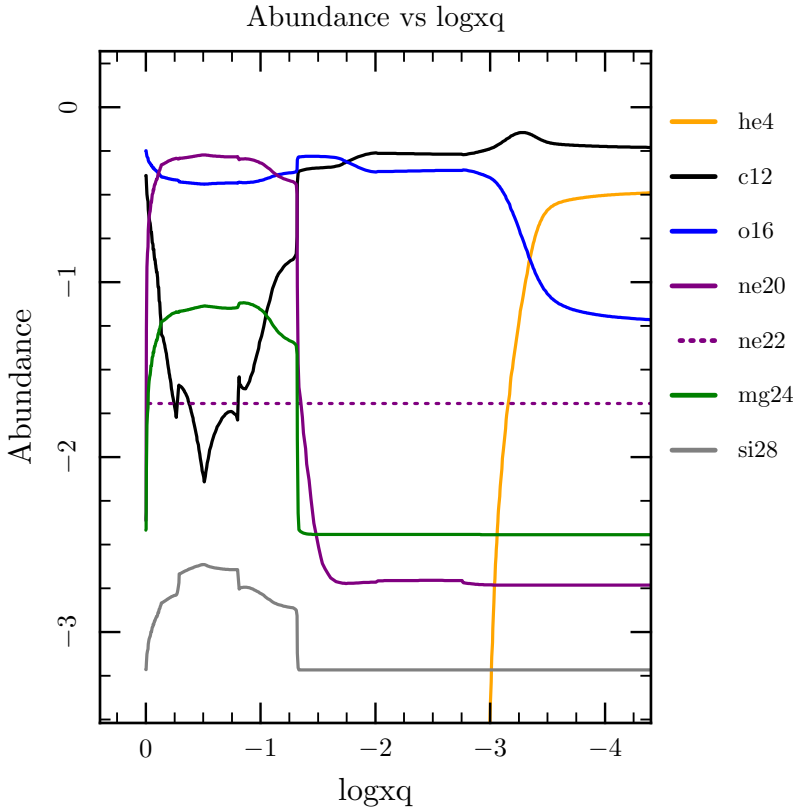

Figure 5

The plot below shows the evolution of the radius of the star (figure 6) through the main sequence and giant phases ending as a small white dwarf.

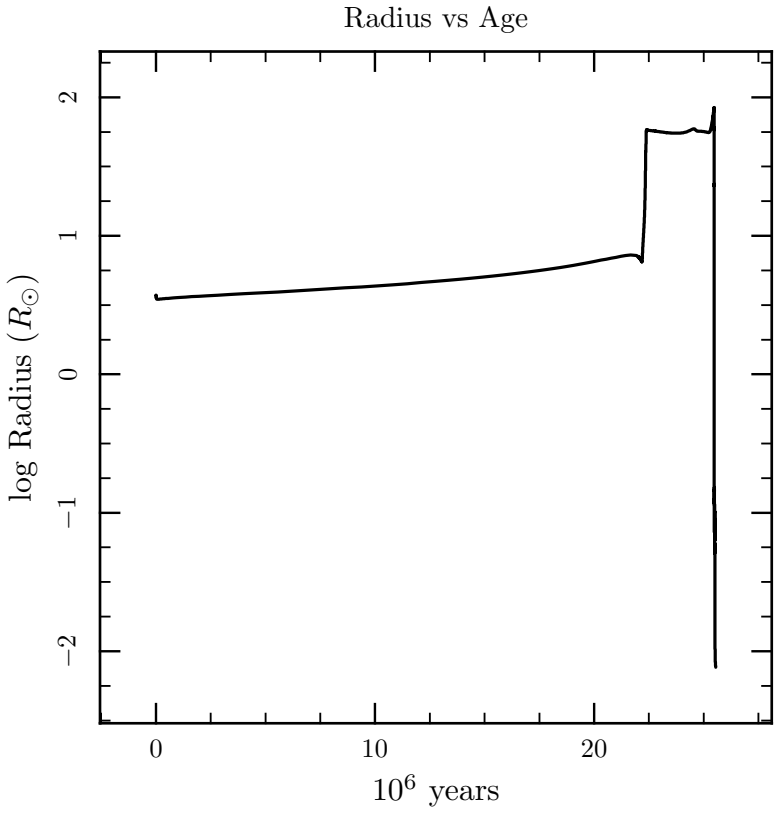

Figure 6: Evolution of the radius

This final plot (figure 7) shows a few internal MESA variables, such as the size of the time-step, the number of zones, and the number of retries against the model number in order to give some understanding of how hard MESA is working throughout the run and where some areas of problems/interest might be.

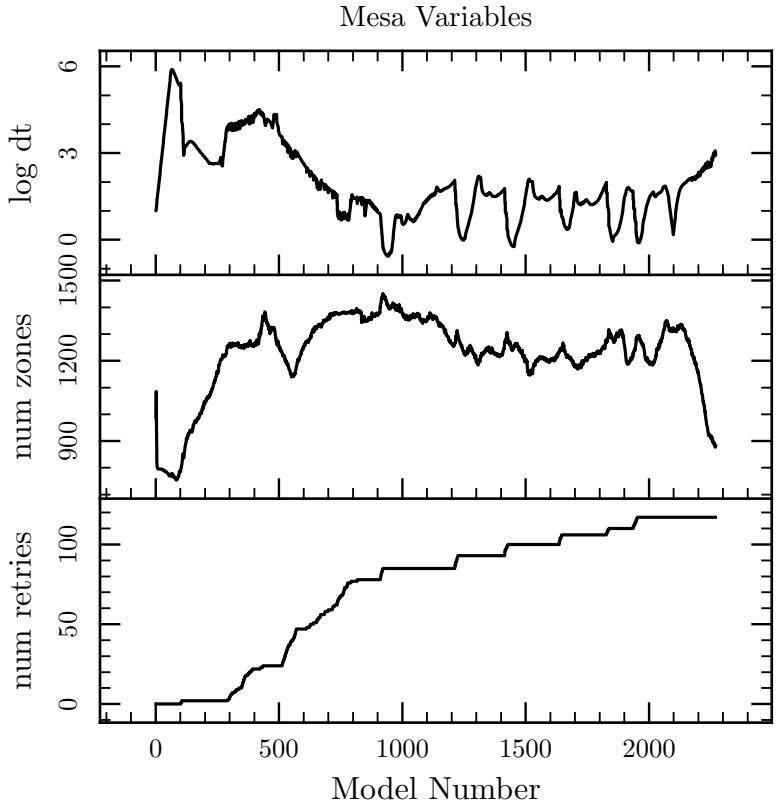

Figure 7: MESA variables plotted against model number show how hard MESA is working