1M PRE MS TO WD

This test is to show a 1 $M_\odot$ pre-main sequence star evolved to a white dwarf. Therefore, this test should be cut off when the log of the surface luminosity drops below -0.5 (`log_L_lower_limit = -0.5`).

The HR-diagram below shows the evolution through the whole run (figure 1).

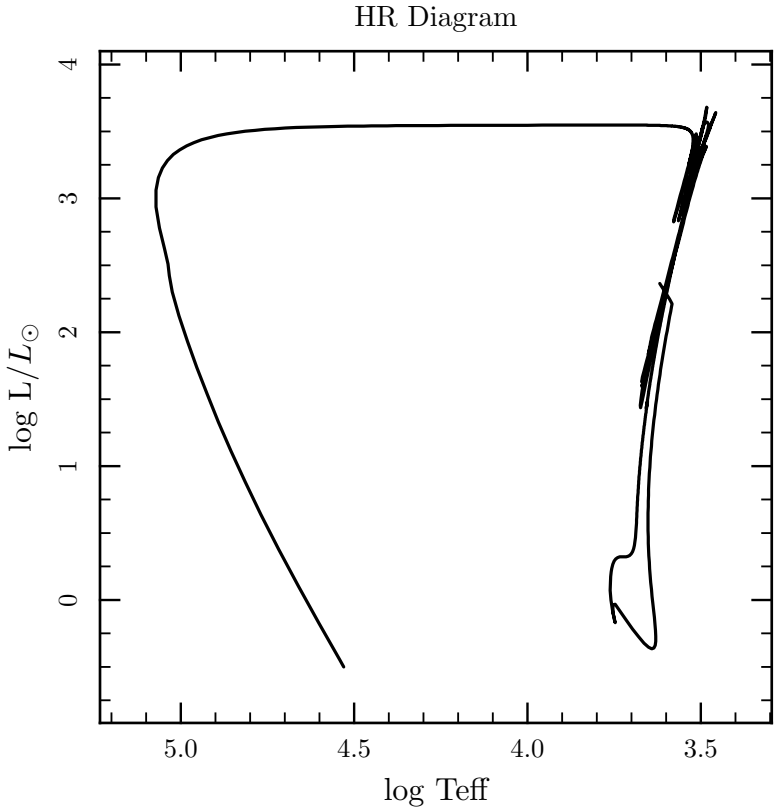

Figure 1: HR-diagram showing pre-MS, MS, RGB, AGB, and WD phases

To the left is an HR-diagram showing the pre-MS and the main sequence (figure 2). To the right is a temperature-density profile from the main sequence (figure 3).

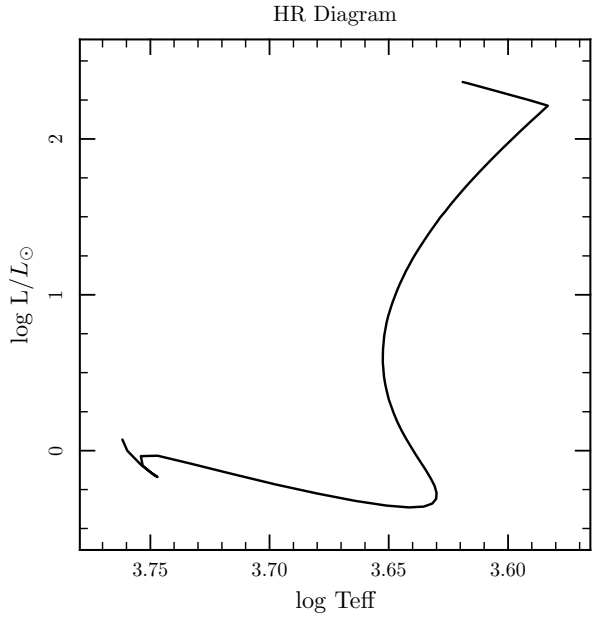

Figure 2: HR-diagram of pre-MS and MS

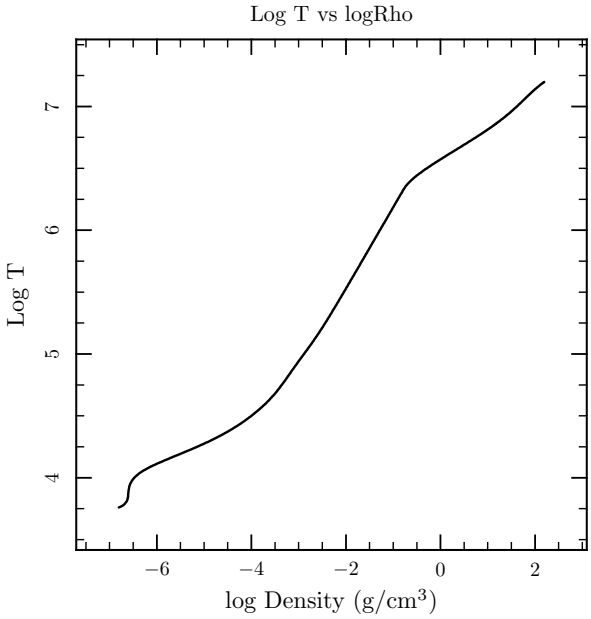

Figure 3: Temperature density profile from MS

Below are an abundance profile (figure 4) and a burning rate profile (figure 5) from the main sequence.

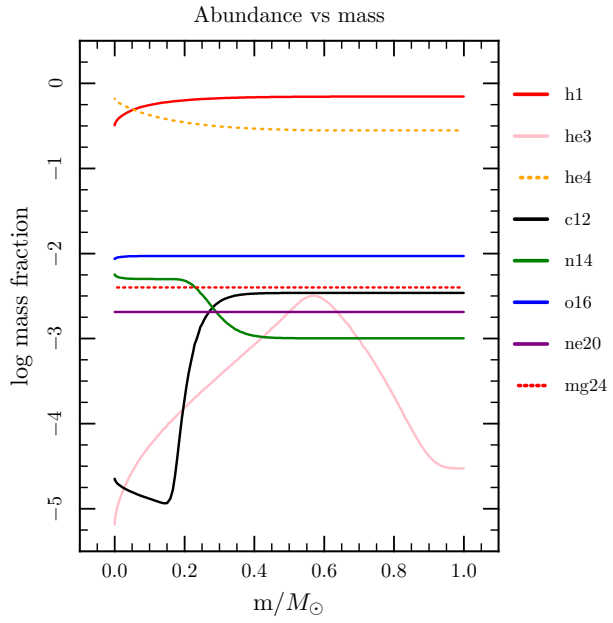

Figure 4: Abundance profile at MS

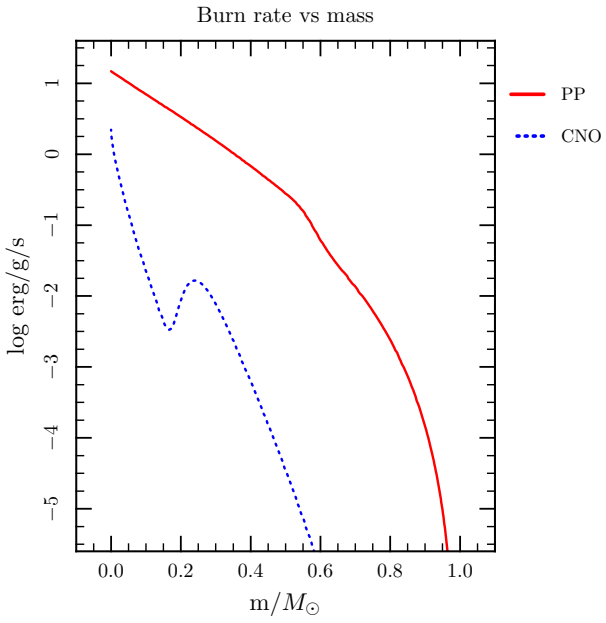

Figure 5: Burning rate profile at MS

To the left is an HR-diagram showing the end of the main sequence and the RGB, with the helium core flash in the upper right corner (figure 6). To the right is a temperature-density profile from the RGB (figure 7).

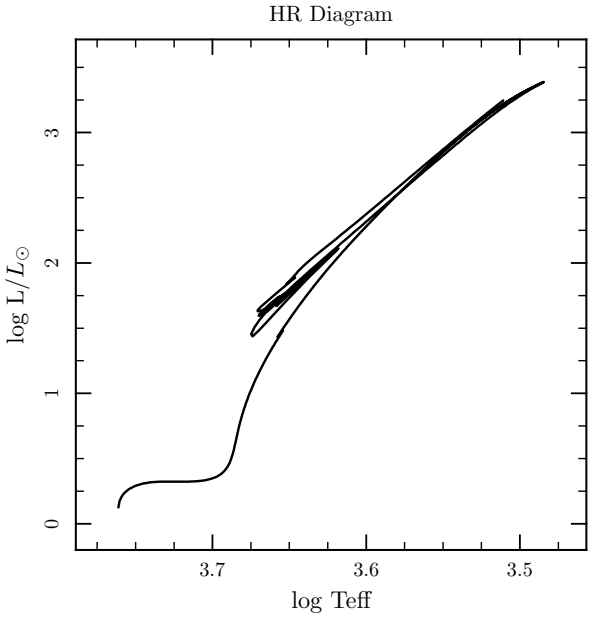

Figure 6: HR-diagram of RGB

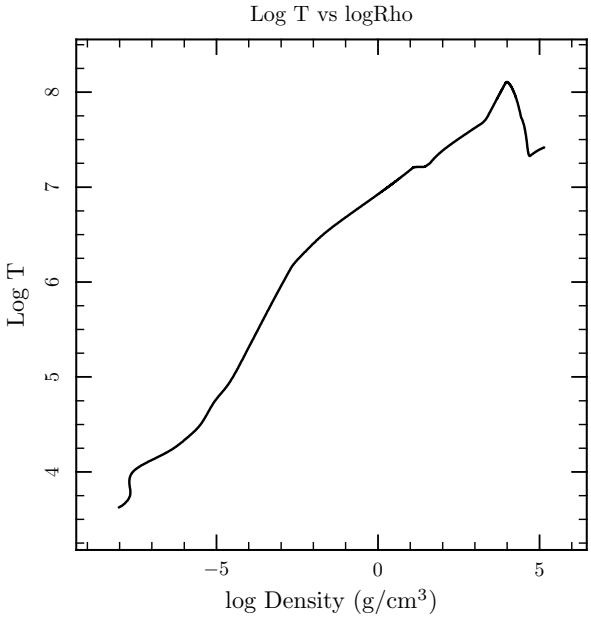

Figure 7: Temperature density profile from RGB

Below are an abundance profile (figure 8) and a burning rate profile (figure 9) from the RGB.

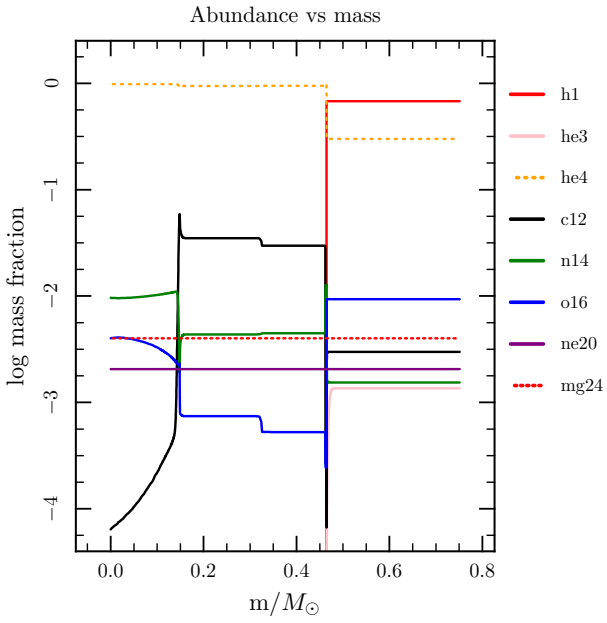

Figure 8: Abundance profile at RGB

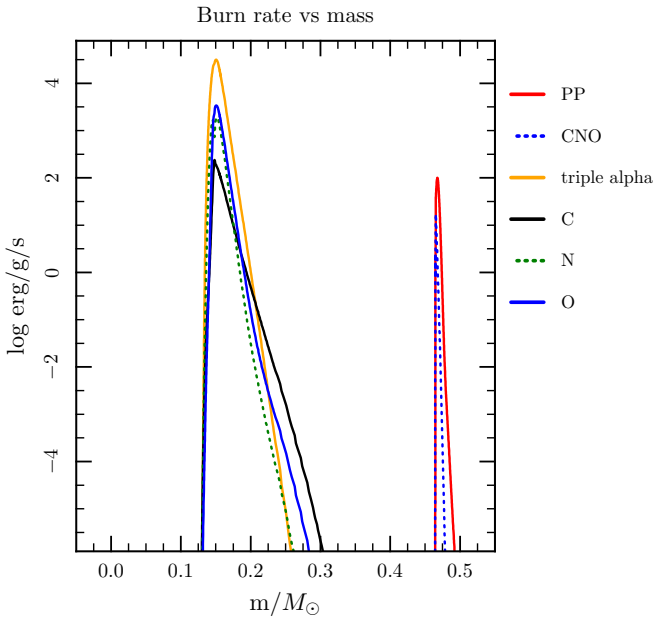

Figure 9: Burning rate profile at RGB

To the left is an HR-diagram showing the early AGB (figure 10). To the right is a temperature-density profile from the early AGB (figure 11).

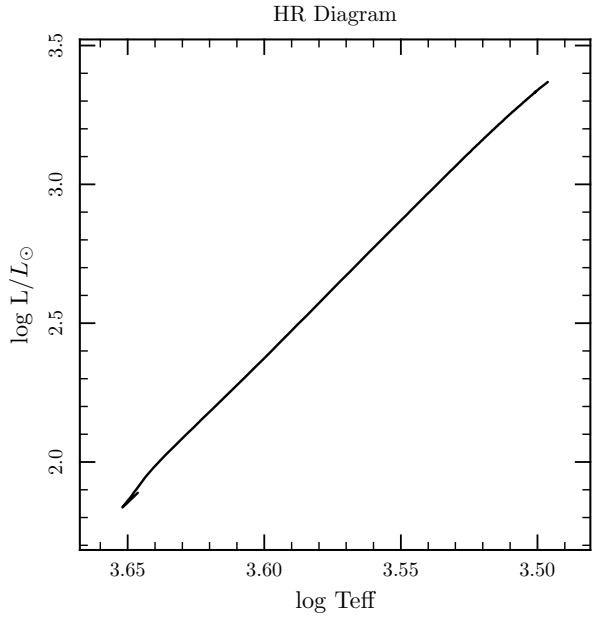

Figure 10: HR-diagram of early AGB

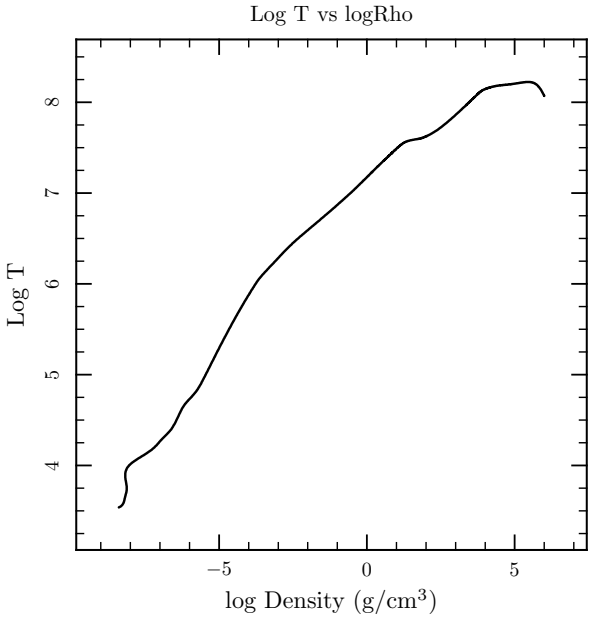

Figure 11: Temperature density profile from early AGB

Below are an abundance profile (figure 12) and a burning rate profile (figure 13) from the early AGB.

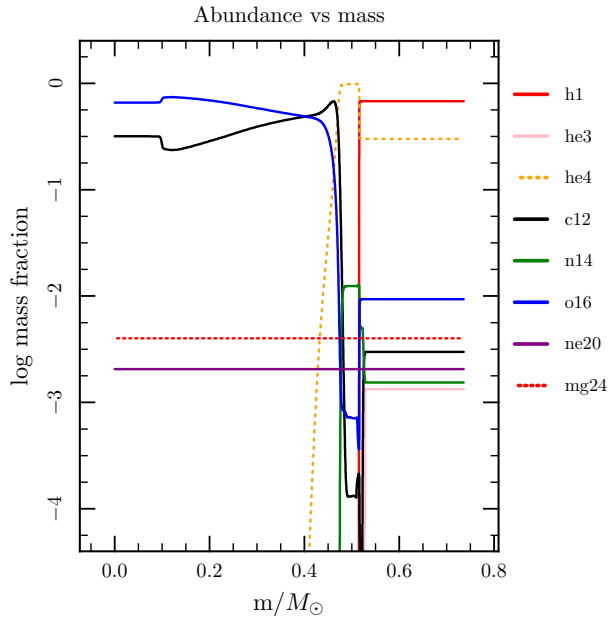

Figure 12: Abundance profile at early AGB

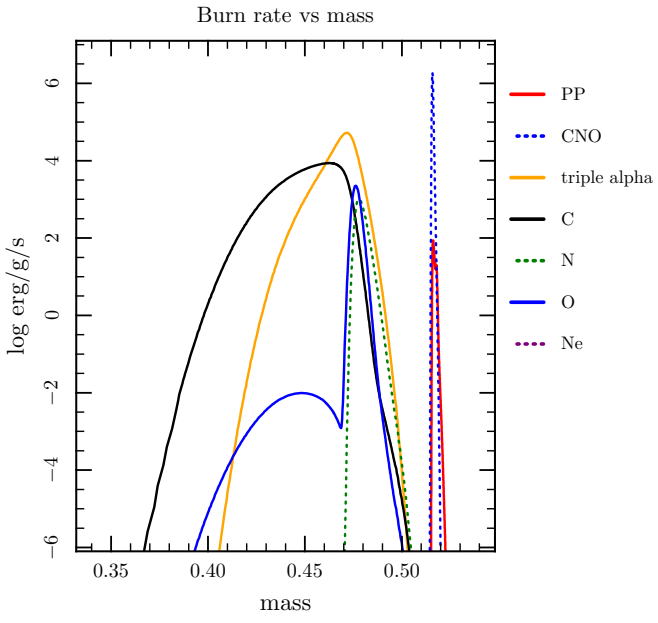

Figure 13: Burning rate profile at early AGB

To the left is an HR-diagram showing the thermally pulsing AGB (figure 14). To the right is a temperature-density profile from the thermally pulsing AGB (figure 15).

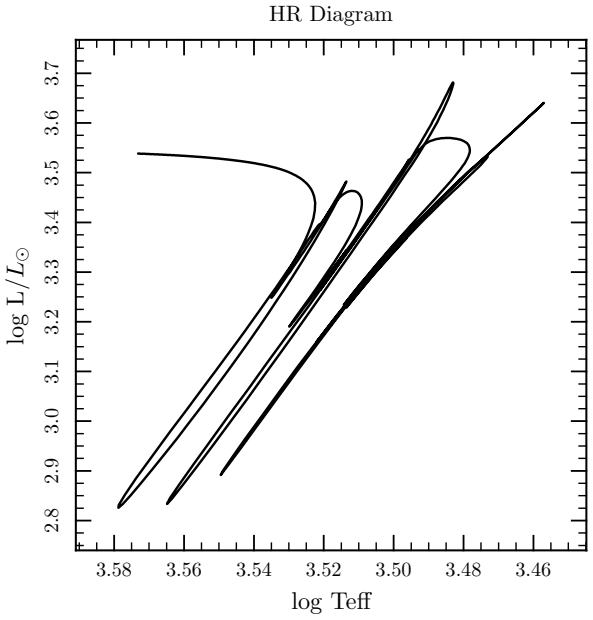

Figure 14: HR-diagram of thermally pulsing AGB

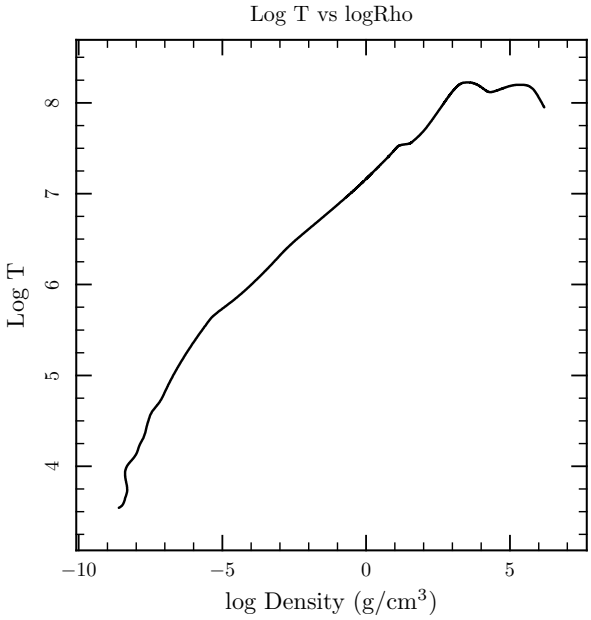

Figure 15: Temperature density profile from thermally pulsing AGB

Below are two burning rate profiles from the thermally pulsing AGB phase. The one on the left (figure 16) shows dominant helium burning during one of the pulses. The one on the right (figure 17) shows dominant hydrogen burning between pulses.

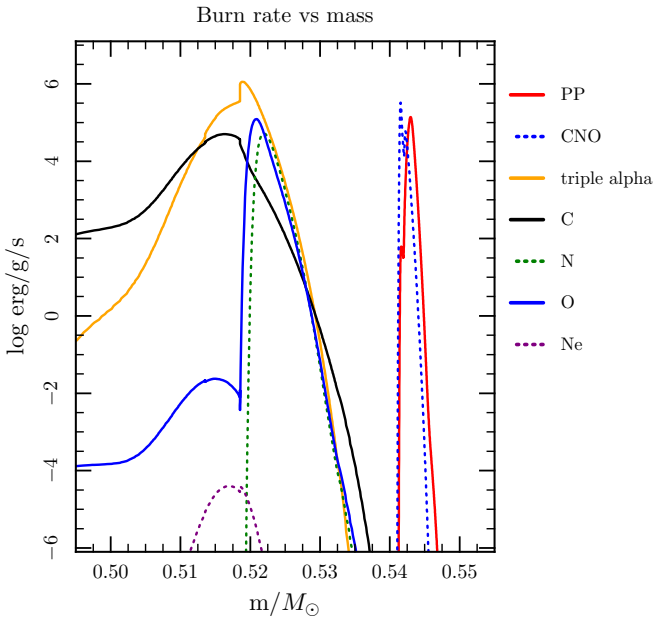

Figure 16: Burning rate profile during thermal pulse

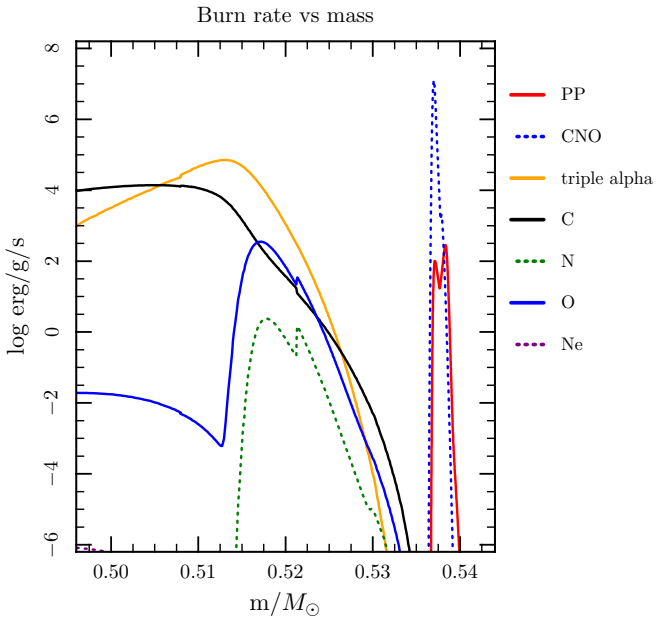

Figure 17: Burning rate profile between pulses

To the left is an HR-diagram showing the transition from AGB to white dwarf (figure 18). To the right is a temperature-density profile from the end of the run (figure 19).

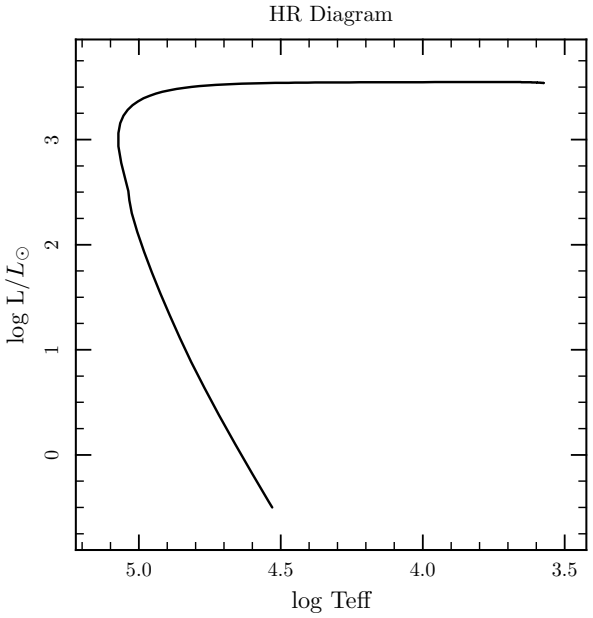

Figure 18: HR-diagram shows AGB to WD

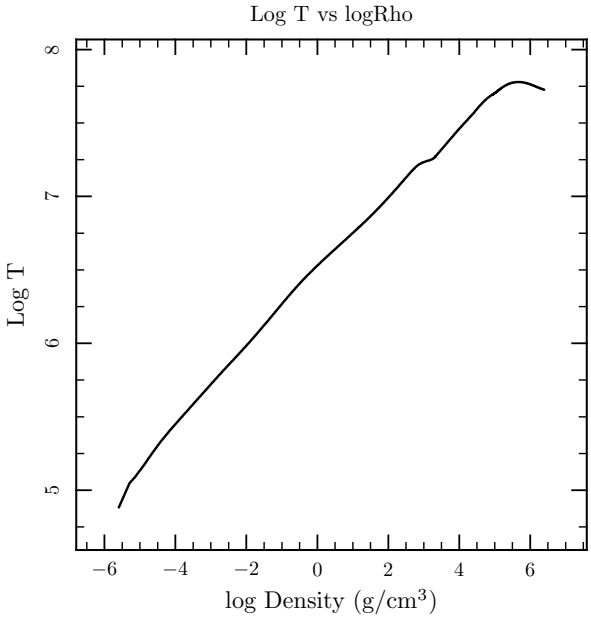

Figure 19: Temperature density profile from end of run

To the left in an abundance profile from the end of the run (figure 20), plotted against logxq where logxq = log(1-q) and q is the fraction of star mass interior to outer boundary of each zone, moving outward from the core. To the right is plot of the evolution of the center temperature and density for the entire run (figure 21).

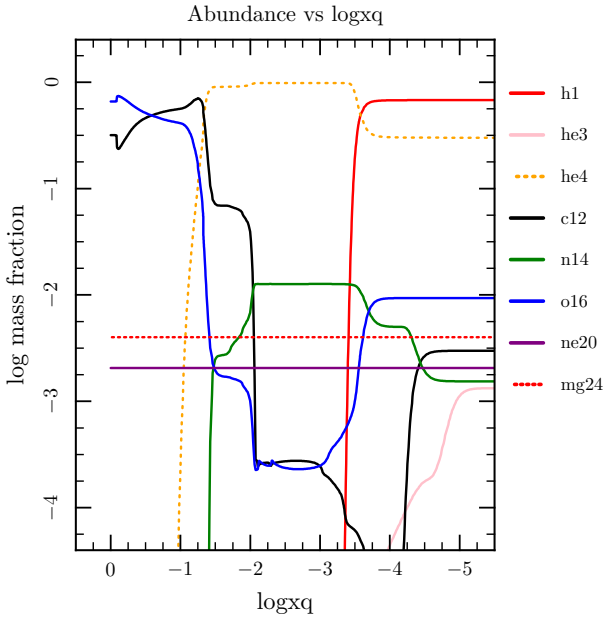

Figure 20: Abundance profile from end of run

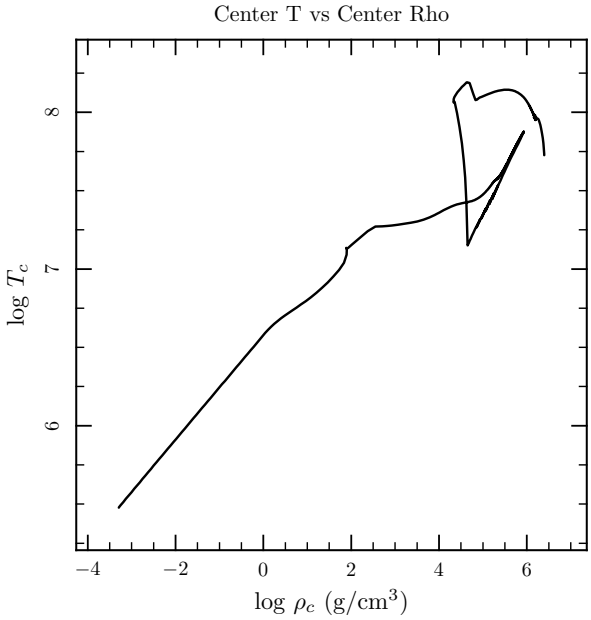

Figure 21: Evolution of center temperature and density

This final plot (figure 22) 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.

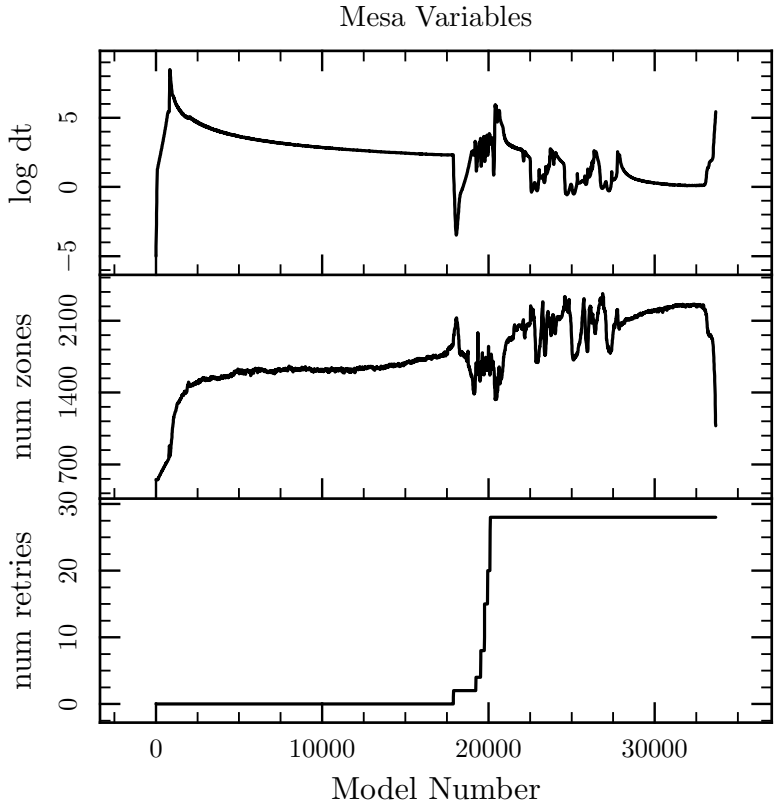

Figure 22: `MESA` variables plotted against model number show how hard `MESA` is working