ASTR 656

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1 Problem 1.1

1.1 Instructions

Verify that in regions where epsilon is zero, the luminosity is constant.

1.2 Results

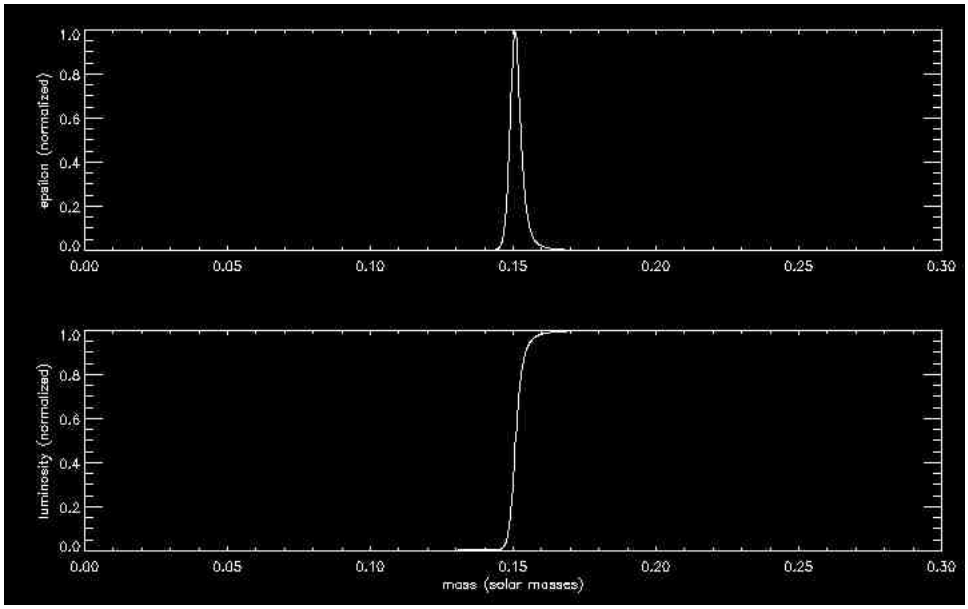

Figure 1: This plot shows epsilon and luminosity as a function of radius.

Figure 1 shows that the luminosity only changes where epsilon has a value greater than zero. When epsilon falls back to zero, the luminosity is again constant at its maximum value.

2 Computer Problem 1.1

2.1 Question 1.

The stellar model including nuclear burning reached an age of about 1.5 billion years when the hydrogen abundance dropped below 0.7.

2.2 Question 2.

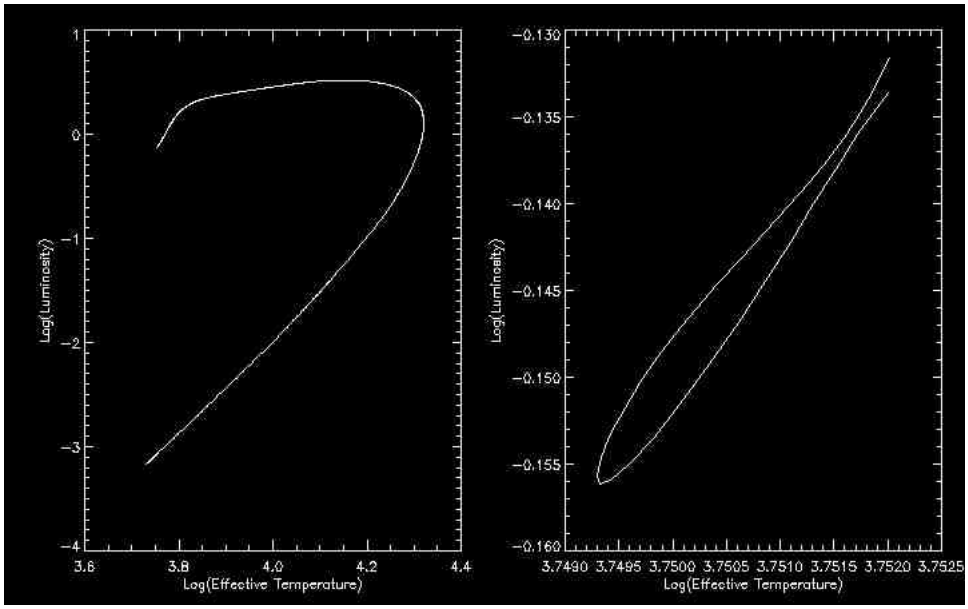

Figure 2: These H-R diagrams show the evolutionary tracks of both models. The model without nuclear burning is on the left, aged to about 10 billion years. The model with nuclear burning is on the right, aged to about 1.5 billion years.

2.3 Question 3.

2.4 Question 4.

The model with no nuclear burning reaches a maximum temperature of about 21000 K while the model that includes nuclear burning only gets to about 5600 K.