Discovery of an Exceptionally Strong β-Decay Transition of $^{20}$F and Implications for the Fate of Intermediate-Mass Stars

February 19, 2020

1. Why is the transition between $2^+ \rightarrow 0^+$ forbidden? Why is the 2nd forbidden non unique transition so difficult to measure? What is $\Delta \pi$? (Mahesh)

2. What does it mean to be a “super asymptotic giant branch” star? (Doug)

3. What is thermonuclear runaway? Why would a rapid rise in density within the star trigger electron capture? (Matt)

4. What is the take-away for figure 3 and what is its significance? In the subfigure, why is there constant temperature $T$ followed by a sharp peak? (Jacob)

Group Discussion Questions, led by Dr. King:

- What is the purpose of the coils in the Siegbahn-Slatis intermediate range beta spectrometer?

- “$p = 0.0003$: unsatisfactory fit quality, $p = 0.080$: satisfactory fit quality”. Explain the p-value in relation to the fitting of the shape of the cosmic ray background parameterized by an exponential fraction (page 3, 1st paragraph).

- Explain light ion fusion evaporation and copper cooling.

- What is the measure of $20$F experimentally/how is the data normalized?