Nuclear Lunch Questions for February 3rd Discussion

Paper:
Urca nuclide production in Type-I X-ray bursts and implications for nuclear physics studies
Merz & Meisel MNRAS 500, 2958 2021

1. How are the depth profiles in Fig1 generated? Explain any one of those plots. **(Nisha)**
2. What is GS 1826- 24? What is its significant and how do other x-ray bursts differ from it? **(Robert Radloff)**
3. In the paper, it is mentioned that the urca nuclides investigated are only odd-A nuclides. Why is it that even-A nuclides don't satisfy the necessary conditions for urca cycling? **(Justin Bryan)**
4. Is the Urca process only inherent to neutron stars? If not, in what other astrophysical settings does this reaction play an important role? **(Jacob Murphy)**
5. How are reaction rates determined by the resonant reaction rate and Hauser-Feshbach approximations? **(Ibrahim)**
6. Why is the resonant reaction rate approximation used for two of the example reaction rates and the Hauser-Feshbach approximation used for two others? **(Shiv)**
7. Is the Hauser-Feshbach approximated for the lowest temperatures of Figure 9? What are the most important uncertainties there? **(Joseph Derkin)**
8. If the reaction cross sections in Figure 9 cannot be measured directly in the energy range of interest for urca nuclide production, what indirect measurements can be done instead? **(Justin Warren)**
9. In Figure 8, what is the significance of the factor of 100 in the blue line? The log scale already shows (p, alpha) is far below the reaction rate for (p, gamma), so why show (p, alpha) x 100? **(Alexandra)**