

## **Nuclear Lunch Questions from “Detection of the r-process peak element Tellurium in metal-poor stars”**

*For discussion on April 10, 2013*

### r- and s-process theory

1. Why do the nuclear magic numbers cause peaks of r-process? And are these neutron-rich nuclei going to absorb another proton? **(Sushil)**
2. Why does beta decay set the time scale for separating neutron captures into “slow” and “rapid” processes? Why are the peaks of r- and s-process abundance in Fig.2 different? **(Andrea)**
3. Since protons are more abundant than neutrons in stars, why does the p-process contribute less to elemental abundances than the r-, and s-processes do? **(Dilu)**

### HST questions

4. What is a 52x52 arc-second field of view? What is program GO-012268? What is the HST spectrograph and how does it work? **(Alina)**
5. Why can't the 2383.28Å Te line be differentiated from Fe II line? What's the detector resolution here and how does it affect that? **(Brian)**
6. Why can't the Te lines be observed from a ground-based detector? **(Cody)**

### Questions about the spectra

7. How did they get the numerical value 2385.79Å? What are log(gf) values? **(Anthony)**
8. What is the signal-to-noise in Fig. 1? In light of that, would you consider these to be good fits? What does the paper say about why the fits look the way that they do? **(Azamat)**

### Questions about the final result

9. Why are metal-poor stars studied instead of metal-rich ones? **(Arbin)**
10. Why are the distributions shown in Fig. 2 normalized to the europium and barium abundances? **(Youngshin)**
11. What's unique about Te, i.e. why did they choose to do this observation for Te? Can they use elements other than Te to do similar observations? **(Nowo)**
12. The element with  $Z = 34$  seems well below r-process line in Figure 2. Is it because it's close to Fe (needs some more complicated model to calculate) or the element abundance is not universal? **(Harsha)**

### And two last questions, if we have time:

13. The Te atoms here are “in a medium”; how do they account the effects of that? **(Linda)**
14. What predicts that 17-20% of the Tellurium in the solar system originated in the s-process? **(Dr. Brune)**