

Nuclear Lunch Questions for 24 October 2012

- 1) Under what conditions is double β -decay more probable than single β -decay? Why does double β -decay happen for even-even nuclei and not odd-even or odd-odd? Or does it? **Shamim**
- 2) What is a Majorana particle? Why does a Majorana neutrino not conserve Lepton number? **Alina**
- 3) Why does the lifetime depend on the effective Majorana mass and nuclear matrix elements? What do these tell us about the process (if it occurs)?
Nowo
- 4) Why is the K-K & K ^{76}Ge result controversial? Refer to Ref. 4 & 19 of this paper, as well as Mod. Phys. Lett. **16** 2409 and the reply. **Harsha**
- 5) How can they use Xe as both the detector and the source? Are the same atoms that are used as a source used as a detector or is there an outside source (made of Xe) and an internal detector? **Linda**
- 6) Why are there so many background sources? Where are they and why not eliminate them? **Bijaya**
- 7) How is the energy of the event determined from ionization? Why does the EXO detector measure the energy of the event from ionization and from scintillation? Why are the scintillation and ionization energies anti-correlated? **Brian**
- 8) Why are the U and V planes at 60° ; why not 45° ? **Anthony**
- 9) Why do they make a distinction between single site (SS) and multi-site (MS) events? **Arbin**
- 10) Why is knowing the free electron lifetime important? Is a short time or a long time better for the experiment, and why? **Andrea**
- 11) Can neutrinos and anti-neutrinos annihilate? What would be the process?
Bing
- 12) What is a virtual particle and how is it different than a non-virtual particle?
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