

Nuclear Lunch Questions (will be answered/discussed on 3/24/2021)

Paper Title:

Improved calculations of β decay backgrounds to new physics in liquid xenon detectors

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Moderator: Justin Bryan

Questions:

- 1) Model: What are the basics of the calculational model used for the predictions of the paper, how are the operators presented used in the calculations? What are the axial and vector coupling constants? Why do they multiply some of the operators presented used for the model calculations? **(Mahesh Poudel)**

- 2) How are the axial and vector coupling constants determined? What are the best values for it and what is the uncertainty on those values? What other measurements can constrain their values and how much do they constrain them. **(Kevin Ward)**

- 3) *(From Ref 9 of paper: about the XENON experiment)* What is the basic setup of the XENON experiment. If you can find any info about S1 vs S2 signals and how they differ, please explain. **(Gula)**

- 4) In Ref 9, the low energy data points of beta-like signal disagree with the background prediction showing an excess that could be consistent with dark matter signals. Should we trust these points? Could this be due to a limit to the detector efficiency? **(Kristyn)**

- 5) What is GEANT and what does GEANT4 stand for? **(Joey Rawley)**

- 6) What is the difference between Gamow-Teller and Fermi beta decays? **(Yenuel)**