

Discussion January 20, 2010: Nuclear Lunch Seminar

Photo-excitation of astrophysically important states in ^{26}Mg
Phys. Rev. C **80**, 055803 (2009).

Question stimulated by the paper:

1. What is parity? What is natural parity and what is unnatural parity? What is the physical importance here? (*4 times asked*)
(Cody)
2. Why is it impossible to directly measure the reaction $^{22}\text{Ne}(\alpha, n)^{25}\text{Mg}$ at low energy?
(Nowo)
3. What is the α -particle threshold? Why is it much higher than the Gamow peak for α -particle capture (or is it)?
(Anton)
4. What is nuclear resonance fluorescence?
(Bing)
5. Explain the spin sequence notation and how the spin changes, and the spin sequence notation to the J^π quantum number.
(Ken)
6. Is there more information or a better explanation (derivation) for Eqs. (1) to (4)? Is there an explanation why $0^+ \rightarrow J^\pi \rightarrow 0^+$ behaves as given in Table I. What are the red doughnuts?
(Jerry)
7. How are the W_{theory} calculations and the excitation energies of the sequences in Tables I and II related to the spin-parity of the excited states in Table III?
(Harsha)
8. How does the detector work such that it measures polarization or spins? (Or does the detector measure polarization and spin?)
How would you assign states by observing the results from the detectors?
(Anthony)
9. What is the importance of the out-of-plane detector? Why do we need it? What determined the choice of the position of the detectors?
(Shloka)

10. What are solid angle effects ?
(Azamat)
11. Why is a c.m. motion correction only applied for the out-of-plane detector?
(Dilu)
12. How are the branching ratios obtained in the paper?
(Chen)
13. About samples: In this experiment a sample from Oak Ridge is used. In addition, a natural sample was used for background measurements. How does the different sample correct the background effect?
(Paul)
14. Though it was a bit discussed after the seminar, can you explain again, how the results will give the production rate of neutrons in the reaction $^{22}\text{Ne} + \alpha$?
(Youngshin)
15. Instead of the conclusions made about the spins, what is meant by $^{22}\text{Ne}(\alpha, n)^{25}\text{Mg}$ and $^{22}\text{Ne}(\alpha, \gamma)^{26}\text{Mg}$ proceed through excited states in the compound nucleus ^{26}Mg ?
(Daniel)
16. What is the meaning of the weak component of the s-process? Explain more about the s-process and weak & strong components of it.
(Open to everyone)
17. What are transfer measurements?
(Open to everyone)