

05/16/2012

Nuclear Lunch Questions

1. Describe in detail the detector setup. How do you detect ^{11}Li , ^9Li and triton particles? Why does one of the particles have to reach the array detector? What is the significance of isobutane? How does it help compared to other gases? Why is the gas prepared at 0° ? How does one take into account the thermal fluctuations of H? What improvements could be made to the detector to count tritons more efficiently? (Brian, use Ref. 6 of the article)
2. Is there a limit on the size (or mass) of the core if a halo is to exist? I.e. can we have a halo around Pb or Sn? In other words, what are the necessary conditions for a halo to emerge, and can such conditions be achieved by heavy nuclei? How can you (experimentally) determine whether a nucleus is a halo nucleus or not? Can a normal nucleus be changed into a halo nucleus? (Cody)
3. In what way is a $1n$ transfer reaction different from a $2n$ transfer reaction (beside the obvious difference of transferring a different number of particles)? What aspects of nuclear physics are probed by these two different reactions? (Arbin, do not focus on halo nuclei for this discussion)
4. How does one infer that the two halo neutrons of ^{11}Li might be coupled to 1^+ or 2^+ from the results of this experiment? Are you yourself convinced by the statement made in the article? (Bijaya)
5. What is the 'continuum effect'? Why is it important for halo nuclei? (Harsha)
6. How is ^{11}Li produced? (Sushil)
7. In the potential, what is the thing that characterizes the two neutron halo nucleus or $3n$ halo? In other words, how can we know from this model that it represents really 2,3 or 4 halo nuclei? (Bing)