

Nuclear Lunch Questions for March 9th Discussion

Paper:

Tsunoda, N., Otsuka, T., Takayanagi, K. *et al.* The impact of nuclear shape on the emergence of the neutron dripline. *Nature* **587**, 66–71 (2020).

1. The paper states that when nucleons are closely configured, an ellipsoidal shape arises. Are there any other prominent, or well-known shapes, that can arise? **(Shyam Chauhan)**
2. What is a Fujita–Miyazawa three-nucleon force? **(Justin Warren)**
3. What is the idea behind the 2-particle neutron drip line? Do we know if the theory presented in this paper agrees with it? **(Yenuel Jones-Alberty)**
4. Why was O-16 chosen to compare to in figure 4? How justified is it to consider the inner shell closed and non-interacting with the rest of the nucleons? **(Joseph Derkin)**
5. What single-particle basis is adopted in the paper? Is the value of V_{monopole} dependent on the single-particle basis adopted? **(Jacob Murphy)**
6. In figure 5, why is there seemingly no correlation between the rest interaction and magic number? Do the authors understand V_{rest} as inducing a non-spherical shape in nuclei? If not, how is the issue of shape ultimately tied to the binding mechanism near the dripline? **(Mahesh Poudel)**
7. If magic numbers don't drive the rest interaction behavior, how is magic number related to the rest interaction overall? **(Gula Hamad)**