

Questions regarding the paper “Machine learning approach to pattern recognition in nuclear dynamics from the ab initio symmetry-adapted no-core shell model”, arXiv:2107.01498 by O. Molchanov et al.

Nuclear Lunch Discussion, 3/22/22, 4 pm

1. Is the deformation referring to that of the SA-NCSM states? In what sense are the states themselves deformed? (Shyam Chauhan)
2. What is the Symmetry Adapted NCSM? What symmetries are exploited there? (Mahesh Poudel)
3. What does the parameter a_k as the output mean? (Inline equation, top of p.3) (Joseph Foy)
4. Does machine learning naturally come up with “correlations” between each input in a group? How? (Noah Smith)
5. Is it possible to include many hidden layers to find a better correlation between neurons? If that will work better why didn't they do it? (Justin Bryan)
6. What is the Poisson loss function? Why does it seem to work better than the mean-squared loss function for the case in this paper? (Pramita Tiwari)
7. To what extent are the ML predictions for heavier nuclei (Er and U) tested here? (Bikash Chauhan)
8. Why is the RLU activation function used for the two hidden layers and the sigmoid activation function used for the output layer? Are there other activation function schemes in Machine learning? Why would you choose one activation function over another? (Ibrahim Alnamlah)
9. Please explain where the N^2LO opt NN potential comes from and what its positive features are. (Alexandra Sempowski)
10. In the predictions for Si-24, what specifically was the model able to predict with $N_{max}=4$? What was an accurate N_{max} ? (Yenuel Jones-Alberty)
11. What are “other” necessary quantum numbers that are represented by the “a” in the ket representing the SA-NCSM state? (Eq. (1)) (Joseph Derkin)