



Contribution ID: 47

Type: **Contributed Talk (45min including questions)**

# Quantum algorithms for the nuclear shell model

*Thursday, November 20, 2025 10:30 AM (45 minutes)*

Quantum simulations offer a promising path toward understanding fermionic quantum many-body systems without the limitations of exponential scaling. In this talk, I will present ongoing efforts to simulate various quantum algorithms designed to address nuclear systems within the shell model framework.

I will begin by discussing hybrid variational algorithms, highlighting our estimates of the quantum resources required for a range of nuclear systems [1,2]. I will then explore predictions for nuclear entanglement properties [3] and how these can be leveraged in quantum computing applications [4].

Finally, I may introduce our recent proposal for an adiabatic quantum algorithm tailored to solving the nuclear shell model [5].

[1] A. Pérez-Obiol et al., Sci. Rep. 13, 12291 (2023), arXiv:2302.03641.

[2] M. Carrasco-Codina et al., arXiv:2507.13819.

[3] A. Pérez-Obiol et al., Eur. Phys. J. A 59, 240 (2023), arXiv:2307.05197.

[4] A. Pérez-Obiol et al., arXiv:2409.04510.

[5] E. Costa et al., arXiv:2411.06954 (accepted in SciPost).

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