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Neural Quantum States in Nuclear Physics

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The nuclear many-body problem poses a significant computational challenge. The Neural-Network Quantum States (NQS) method, leveraging machine learning, has emerged as a promising approach for nuclear structure and quantum many-body simulations [1-4]. This variational method employs neural networks as flexible wave function ansätze, enabling the representation of complex quantum states.
In this talk, I present an overview of the NQS method. I discuss the two principal research lines in the field, namely neural network architectures and energy minimisation, and I mention our contributions to these fields [1, 2, 5].

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[3] C. Wang, T. Naito, J. Li & H. Liang, arXiv 2403.16819 (2024)
[4] A. Lovato, C. Adams, G. Carleo & N. Rocco, Phys. Rev. Res. 4 (2022)
[5] M. Drissi, J. Keeble, J. Rozalén Sarmiento & A. Rios, Phil. Trans. R. Soc. A 382 (2024)

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