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Time-Dependent Neural Quantum States: a new approach for quantum dynamics

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Neural Quantum States (NQS) leverage the parameterization of the wave function with neural-networks. In contrast to other variational methods, they are highly scalable with system size and capable of capturing complex behaviours.

Here, we present proof-of-principle time-dependent NQS simulations to illustrate the ability of this approach to effectively capture key aspects of quantum dynamics in the continuum, from the simple quantum harmonic oscillator to the Gross-Piraevskii Equation.

These results highlight the potential of NQS for studying quantum dynamics and open the way for applications in more complex many-body systems, including ultracold atoms, nuclear physics, and quantum simulation.

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