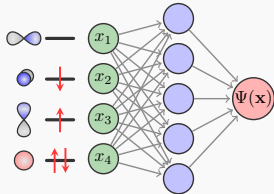# AI 4 Quantum

Synergistic AI+QC+HPC toolkit for the computational study of complex quantum matter
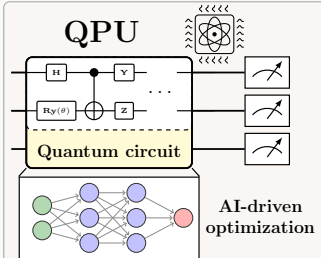
Neural Network States for Quantum Matter

- **Compress** exponential complexity of target solution, $\Psi(\mathbf{x})$

- **Resource reduction**: physics-informed, symmetry-preserving neural quantum states

AI-driven Quantum Computing Approaches

- Increase **noise-resilience** and optimization of quantum algorithms

- **ML optimization** of quantum Ansätze: Gates and parameters

QPU

Quantum circuit

AI-driven optimization

AI-enhanced Quantum Monte Carlo Methods

- **Extend reach** and acc. of QMC: AI-enhanced sampling of exponential state space

- Big data ML approach for **optimal sampling**

QMC
AI-enhanced QMC

Energy

Iterations