Argonne NATIONAL LABORATORY

PHY Seminar

Physics Division Seminar

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An Overview of Recent Progress in Nuclear Quantum Monte Carlo

Host: Daniel Santiago

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The last decades have witnessed the emergence of the basic model of theoretical nuclear physics. Effective field theories exploit the symmetries of quantum chromodynamics to systematically construct nuclear potentials and consistent electroweak currents. They are the main input to "ab-initio" many-body methods, aimed at solving the Schrödinger equation. Among them, quantum Monte Carlo approaches are known for their accuracy and their capability of dealing with short-range nuclear dynamics. I will report on recent quantum Monte Carlo progress towards a comprehensive description of nucleon-nucleon scattering, the structure and electroweak interactions of light nuclei, and the nucleonic matter equation of state. The impact of these calculations on the long-baseline neutrino-oscillation experimental program will also be discussed.