

IJC colloquium

Ulf-G MEISSNER (Universität Bonn & Forschungszentrum Jülich)



Professor Ulf-G Meissner is a theoretical physicist whose research topics are hadronic physics and nuclear physics. He obtained his PhD in 1982 at Stony Brook in the United States and has been Full Professor at Bonn University since 2003. He has made great developments in chiral perturbation theory, effective field theories, nuclear lattice simulations and lattice QCD. His work has been recognised by several prizes, including the Lise Meitner Prize of the European Physical Society in 2016.

The nucleus as a quantum laboratory

Nuclei are strongly interacting fermionic systems that exhibit strong multi-particle correlations. In this talk, Nuclear Lattice Effective Field Theory is used to tackle this difficult problem. First, I discuss the emergence of geometry and duality in the carbon nucleus. In particular, I provide a model-independent density map of the geometry of the nuclear states of ^{12}C . Second, I introduce a new approach for solving quantum many-body systems called wave function matching. Wave function matching transforms the interaction between particles so that the wave functions at short distances match that of an easily computable interaction. This allows for calculations of systems that would otherwise be impossible due to problems such as Monte Carlo sign cancellations. The method is applied to lattice Monte Carlo simulations of light nuclei, medium-mass nuclei, neutron matter, and nuclear matter. These calculations give new insights on the nuclear interactions that may help to resolve long-standing challenges in nuclear structure physics.

Mardi 27 juin 2023

à 10H30

Café servi à 10H

**Auditorium
Pierre Lehmann**



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