Université Paris-Saclay
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Séminaire de Physique Nucléaire Théorique

From Nuclear Forces to Nuclei

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Nuclear physics has experienced something of a renaissance in recent decades, owing in part to three developments : New experimental facilities and capabilities, chiral effective field theory (EFT) for nuclear interactions, and increasing computational power. This talk will present my particular take on the latter two developments. Almost all modern nuclear forces are derived within the framework of chiral EFT - though many open questions about implementation remain. However, even if nuclear forces were known unambiguously, nuclei are still strongly interacting many-body quantum systems, and so, sophisticated numerical techniques are needed to calculate their properties. At this juncture is the research I will present. I will review the foundations of quantum Monte Carlo calculations with so-called local chiral EFT interactions, show a few recent applications, and conclude with some exciting prospects for the future.

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