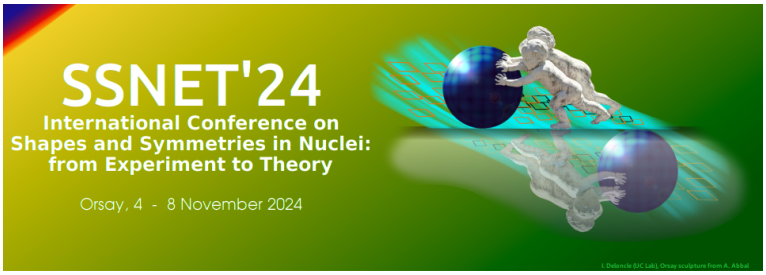

ID de Contribution: **79** Type: **Non spécifié**

Shape Coexistence and quantum phase transitions in even-even and odd-mass nuclei

lundi 4 novembre 2024 17:50 (20 minutes)

The phenomenon of quantum phase transitions (QPTs) is highly investigated in many fields on physics, and, in particular, nuclear structure. QPTs in atomic nuclei refer to (mostly) abrupt changes in the structure of the spectrum. The changes are identified in the nuclear shapes of the ground state, with varying nucleon number - from one shape evolving to another (Type I QPT) or when another state is associated with a different coexisting shape that crosses and becomes the ground state shape (Type II QPT, also called configuration mixing and crossing).

In this talk, I will introduce the topic of QPTs in the algebraic frameworks of the interacting boson model (IBM) and interacting boson-fermion model (IBFM), both with configuration mixing (shape coexistence). Such frameworks allow us to explore shape evolution and coexistence of even-even (IBM) and odd-mass (IBFM) nuclei. I will present how these frameworks are applied to different chains of isotopes exhibiting QPTs and, in some cases, how both Type I and II QPTs can be recognized in the same chain. The latter situation, named intertwined QPTs (IQPTs) was recently identified in both even-even and odd-mass chains of isotopes around $A \approx 100$.

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Classification de Session: Session 4