

PhD Scholar Opening Irène Joliot-Curie

Laboratoire de Physique
des 2 Infinis

F2-HECK Joint CNRS/CEA Project From Few-body to High-Energy antinuclei Collision Kinematics



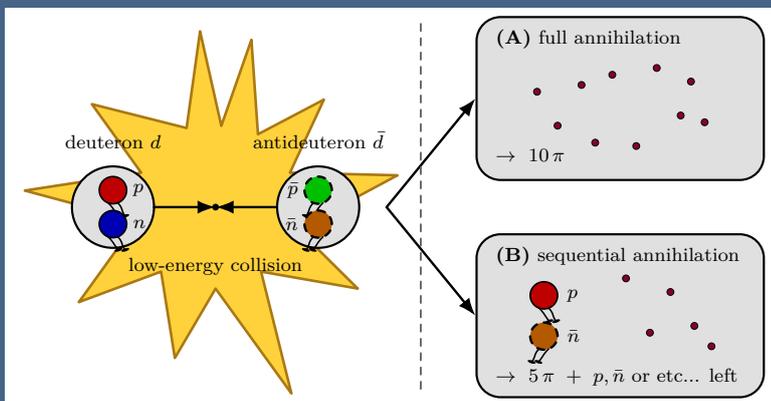
The opportunity

The joint CNRS–Université Paris-Saclay IJCLab invites applications for a **PhD potentially fully financed PhD scholarship** in the **Nuclear Theory Team**.

The successful candidate will join the group of Dr. Guillaume Hupin (Co-PI) and contribute to the F2-HECK project “*From Few-body to High-Energy antinuclei Collision Kinematics*” between CNRS and CEA lead by the PI of the project Dr. Jean-Christophe David at CEA.

F2-HECK aims to connect state-of-the-art *ab initio* nuclear theory with nuclear simulation code, leveraging complementary expertise within the consortium.

F2-HECK develops an *ab initio*, bottom-up description of low-energy nucleus-antinucleus interactions to enable reliable modeling of cosmic ray signals relevant to dark matter. We will compute scattering, atomic level shifts/widths, and annihilation observables, with a flagship focus on *deuteronantideuteron collisions* and extensions to light *p*-shell nuclei. By separating sequential vs simultaneous annihilation and propagating uncertainties from *NN* and $\bar{N}N$ interactions, we will deliver validated nuclear inputs for experiments (PUMA/ALICE) and astroparticle applications. A dedicated work package will transfer these microscopic constraints into the INCL reaction model code to improve antideuteron annihilation and will allow to transition towards reaction mechanisms across a wide range of energy. This two-way theorysimulation loop will provide the nuclear data and modeling tools needed to interpret future cosmic-ray antinuclei searches.



Growth trajectory

Ab initio methods



Nuclear/Particle physics



Few-body methods



HPC & scientific software practices



Communication & collaboration



Beginner | Developing | Proficient | Advanced



Through the Looking Glass: Matter Meets Antimatter by a generative AI.

Host Lab:

CNRS-Nucléaire et particules/IJCLab
Université Paris-Saclay

Main collaborator:
Dr. G. Hupin

CEA (Project PI):
Dr. J.-C. David

Apply at:
Dr. Guillaume Hupin