

Master (M2) Stage proposal

Lab: **Centre de Physique Theorique (CPT), UMR 7332, Aix-Marseille
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Research team: **E7: " Systèmes dynamiques: théorie et applications "**

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Project title: A Lie-Jordan Framework for Classical and Quantum Mechanics.

Abstract:

The Lie-Jordan Algebraic structure is a non-associative generalization of the Poisson structure. It is well adapted to describe the Classical or Quantum Hamiltonian Dynamics (via its Lie structure), as well as the associated "States" (via its Jordan structure), giving rise to an "Heisenberg Uncertainty Principle". Or the quantization by deformation.

This Master project consists in an introduction to this framework, and the "Quantum States" or "Quantum Information".

A possible goal is to build a first example of these "non-local quantum space". For instance with some qubits.

References:

Doering & Isham: "A Topos Foundation for Theories of Physics: I. Formal Languages for Physics", ArXiv: quant-ph/0703060

C. J. Isham, J. Butterfield: "Some Possible Roles for Topos Theory in Quantum Theory & Quantum Gravity", Foundations of Physics, Vol. 30, No. 10, 2000