

INTERNSHIP PROPOSAL

(One page maximum)

Laboratory name: Eviden Quantum Lab

CNRS identification code: N/A

Internship director's surname: Thomas Ayrat

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Phone number:

Web page: <https://eviden.com/solutions/advanced-computing/quantum-computing/>

Internship location: Les Clayes-sous-Bois

Thesis possibility after internship: YES

Funding: YES

If YES, which type of funding: Eviden

Noise modeling and applications of a small-scale superconducting processor

Superconducting qubits are among the most advanced qubits. Within its partnership with Finnish startup IQM, Eviden has access to a superconducting processor through its Qaptiva platform. The goal of this internship is to characterize the noise model of this processor (using e.g tomography methods) and use this characterization to improve experimental runs in several application domains using e.g error mitigation techniques.

The Eviden quantum laboratory is based in les Clayes-sous-Bois in the Paris area. It is a research and development team whose focus is quantum computing. Our goal is to make quantum computing useful by providing quantum programming languages and libraries (including compilation tools for most existing quantum hardware), by delivering powerful realistic classical simulators (digital twins) of quantum processors to predict and improve the outcome of experimental quantum computations, and by developing new algorithms for a wide spectrum of applications ranging from quantum many-body physics (condensed matter, quantum chemistry) to combinatorial optimization over differential equations. These developments are made concrete, in particular, in Eviden's Qaptiva platform, our quantum programming platform.

The internships we propose typically involve Python programming. Basic knowledge in quantum mechanics, a solid understanding of linear algebra, fluent Python and English, and a will to learn are skills you will definitely put to use here. Experience with tensor networks, condensed matter physics, git, linux or C++ are also appreciated.

Please, indicate which speciality(ies) seem(s) to be more adapted to the subject:

Condensed Matter Physics: NO Soft Matter and Biological Physics: NO

Quantum Physics: YES

Theoretical Physics:

YES