# ***INTERNSHIP PROPOSAL***

*(One page maximum)*

Laboratory name: Eviden Quantum Lab
CNRS identification code: N/A
Internship director'surname: Thomas Ayral
e-mail: thomas.ayral@eviden.com 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

**3.Building a black-box solution for improved quantum adiabatic algorithms**

Quantum adiabatic algorithms allow to prepare interesting quantum states, with a potential for quantum materials, chemistry, or even combinatorial optimization problems. In their basic formulation however, they require very long quantum computation time, and therefore qubits of unreachable quality as of now. Solutions exists to accelerate them, using e.g. counterdiabatic terms, fastforward or dynamical invariant methods.
The goal of the internship is to study these acceleration techniques and to produce a code, potentially as a part of Qaptiva, for the layman to accelerate their own adiabatic algorithm given their constraints.

*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: YES Soft Matter and Biological Physics: NO
Quantum Physics: YES Theoretical Physics: YES