Master: ***International Centre for Fundamental Physics***

INTERNSHIP PROPOSAL

(One page maximum)

Laboratory name: Center for Theoretical Physics (CPHT)
CNRS identification code: UMR7644
Internship director'surname: Karyn Le Hur
e-mail: karyn.le-hur@polytechnique.edu Phone number: 01 69 33 42 67
Web page: http://www.cpht.polytechnique.fr/cpht/lehur/Karyn.LeHur.html
Internship location: Ecole Polytechnique

Thesis possibility after internship: YES
In relation with the projects below

Title: Quantum Phases, Interactions and Topology

Summary (half a page maximum)

We have an opening for an internship and possibly a PhD thesis, related to quantum physics and topological phases of matter with applications in quantum materials, ultra-cold atoms and light-matter systems, Josephson junction arrays and quantum electrodynamic systems.

The theoretical project can include the following subjects: topological phases; many-body time-dependent phenomena and realisation of artificial gauge fields, stochastic approaches, driven light-matter and quantum impurity systems; novel probes of correlated phases and entanglement.
Methods go from analytical mathematical calculations, quantum field theory to numerical approaches.

Motivated students are welcome to send CV and motivation letter via e-mail (karyn.le-hur@polytechnique.edu).

The PhD project is related to a German DFG-Research Unit Forschergruppe Project on "Artificial Gauge Fields and Topological Phases in Ultra-Cold Atoms" in collaboration with Immanuel Bloch, Fabian Heidrich-Meisner, Belen Paredes, Ulrich Schoellwock (Muenich), Walter Hofstetter (Frankfurt), Leticia Tarruell (Barcelona), Andre Eckardt (Dresden), Klaus Sengstock and Christof Weitenberg (Hamburg), Ulrich Schneider (Cambridge).

The project is also related to an ANR BOCA on topological phases with light and Josephson junction systems

Please, indicate which speciality(ies) seem(s) to be more adapted to the subject:
Condensed Matter Physics: YES Quantum Physics: YES Theoretical Physics: Y E S
Complex Systems YES