

PhD Position in Theoretical Physics

Project: Simulating the quantum dynamics of a system of interacting particles using GPUs

For more than a century, statistical physics has proved a powerful framework for understanding the behavior of systems made of a large number of particles. Recent progress in quantum technologies have now started challenging this framework by displaying new and unpredicted equilibrium states of matter for instance with cold atoms or trapped ions. Building a theoretical framework for understanding these new macroscopic quantum states is currently a crucial question of interest both fundamentally regarding the foundations of statistical physics and also on the practical side for the applications in quantum engineering.

In this project, the student will investigate the dynamics of strongly interacting quantum systems in order to explain the recent experimental results. They will learn how to use recently developed mathematical tools useful for analytical calculations and will do High Performance Computing using Graphical Processor Units to simulate numerically the quantum dynamics of many body systems.

There are no prerequisites for this project other than the usual undergraduate quantum theory and statistical physics training and a good taste for programming (e.g. in C or Python).

Scientific Environment:

The project is based in the Physics Department at Royal Holloway University of London and is funded by a grant from the Leverhulme Trust. The student will be included in the postgraduate teaching programme of GRADnet of the South East Physics network (SEPnet) and will have the opportunity to attend international conferences and collaborate with experimentalists.

Funding Availability: Funding is available for Home/EU student for this project.

Qualifications: Master or equivalent diploma degree in Physics, or related

Research area: Quantum physics- Statistical physics

Duration: 3.5 years

Starting date: to be defined

Deadline: application accepted all year round

Application: send (i) CV, (ii) academic transcript, (iii) short statement of research interest to Dr Gregoire Ithier (gregoire.ithier@rhul.ac.uk).

Contact:

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