

A tensor network approach to the quantum many body problem,

Fri, 2017-01-20 01:49 - [Luca Tagliacozzo](#) [1] **At:** shared PhD between Strathclyde and ICFO
Deadline: 28 February, 2017

Location

The University of Strathclyde Glasgow United Kingdom
55° 51' 51.2532" N, 4° 15' 6.5016" W
See map: [Google Maps](#) [2]

The many body problem

How is it possible that the same and simple constituent atoms, when joined together, produce such a beautiful and diverse world? One can see this as a consequence of collective emergence, an aspect of physics relevant to several disciplines, from statistical physics to condensed matter, to high energy physics.

Tensor Networks

We will address collective emergence in the framework of quantum many-body systems described through tensor networks. By using tensor networks, the states of many-body system are described efficiently by means of the contraction of a network of small constituent tensors, making such a description viable also for large systems. Tensor networks thus offer a rich and ideal playground for analytical and numerical studies of many-body problems.

The Ideal Candidate

We are looking for a talented PhD student who wants to embark on the development of tensor networks techniques, either in the context of strongly interacting 2D system or in the context of the out-of equilibrium evolution of 1D quantum systems. The ideal candidate should have good analytical and numerical skills, be highly motivated, and be enthusiastic about joining a very active area of research.

Tensor Networks for quantum simulations

The proposed theoretical studies will also be relevant for ongoing experimental efforts, including work being performed in the Experimental Quantum Optics and Photonics Group in the Department of Physics of the University of Strathclyde.

PhD at Strathclyde and in Scotland

The available PhD is part of the ongoing collaboration between Dr. Luca Tagliacozzo at Strathclyde and the QOT group of Prof. Maciej Lewenstein at ICFO.
The candidate will be based at Strathclyde, <http://cnqo.phys.strath.ac.uk/> [3]
but will spend a significant amount of time at ICFO in Barcelona
https://www.icfo.es/research/groups-details?group_id=23 [4] .

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We also offer postgraduate teaching and training as part of the SUPA (Scottish Universities Physics Alliance) and IMPP (International Max Planck Partnership). Financial support is available for collaborative work and for presentation of results at national and international conferences. Applicants should have an excellent master degree in Physics, Applied Mathematics, Engineering, or a related discipline.

- [PhD](#) [5]

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Links:

[1] <http://qurope.eu/users/luca-tagliacozzo>

[2] <http://maps.google.co.uk?q=%2C+Glasgow%2C+%2C+uk>

[3] <http://cnqo.phys.strath.ac.uk/>

[4] https://www.icfo.es/research/groups-details?group_id=23

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