清华大学高等研究院

Institute for Advanced Study, Tsinghua University

学术报告

Title: **Strongly interacting few and many-body systems: from cold atoms to photonics**

Speaker: **Valiente Cifuentes Manuel**
Heriot-Watt University

Time: **4:00pm, Friday, April 21, 2017**

Venue: **Conference Hall 322, Science Building, Tsinghua University**

Abstract

In this talk I will present an overview of how the problem of strong interactions can be approached in cold atomic systems and classical optical analogs. I will show how one-dimensional systems can be efficiently and non-perturbatively described using few-body techniques I recently developed for scalar [1] and multi-component systems [2] even in the many-body limit. These methods can be used to realise physical implementations of generalised spin chains which can be used to build a quantum spin transistor [3]. I will also show how optical systems can be used to simulate quantum phenomena. In particular, we recently prepared and observed anomalous topological edge modes in a photonic lattice [4], and stable liquids of light with orbital angular momentum in nonlinear optical media.

References:

[1] M. Valiente and P. Ohberg, PRA 94, 051606 (R) (2016).

[2] A. G. Volosniev, D. V. Fedorov, A. S. Jensen, M. Valiente and N. T. Zinner, Nature Comms. 5, 5300 (2014).

[3] O. V. Marchukov, A. G. Volosniev, M. Valiente, D. Petrosyan and N. T. Zinner, Nature Comms. 7, 13070 (2016).

[4] S. Mukherjee, A. Spracklen, M. Valiente, E. Andersson, P. Ohberg, N. Goldman and R. R. Thomson, Nature Comms. 8, 13918 (2017).