



## Seminar

### Probing scrambling and topology via random measurements

**Benoit Vermersch**

*University of Innsbruck*

**Time: 4: 00 pm, Feb. 22, 2019 (Friday)**

**时间: 2019年2月22日 (周五) 下午4:00**

**Venue: Room W563, Physics building, Peking University**

**地点: 北京大学物理楼, 西563会议室**

#### Abstract

Recently, statistical correlations between randomized measurements have emerged as a new tool to probe entanglement properties of many-body quantum states [1]. After a general introduction showing some recent experimental demonstrations [2], I will discuss two new applications: First, I will present a protocol to measure out-of-time ordered correlation functions (OTOCs) and "scrambling", without the necessity of implementing time reversed operations or ancilla degrees of freedom [3]. I will then show how the same tools can be used to experimentally classify symmetry protected topological (SPT) phases in one-dimensional spin systems [4].

[1] Phys. Rev. Lett. 120, 050406 (2018).

[2] arXiv:1806.05747.

[3] arxiv:1807.09087.

[4] A.Elben, B.V, J. Yu, G. Zhu, M. Hafezi, and P. Zoller (in preparation).

#### About the speaker

Dr. Benoit Vermersch was born in 1986, and studied for B.S. at Ecole Polytechnique (2006-2009). He received his PhD in 2013, supervised by Dr. J.-C. Garreau from the University of Lille. His research has been focused on the implementation of many-body quantum systems: Rydberg atoms, cold atoms, trapped ions, and superconducting qubits, and also measurement protocols. He also develops architectures for quantum networks with dipolar systems and photons. Since 2017, he has been a senior scientist in Peter Zoller's group at Innsbruck.