

# CS Seminar

## **QICI Talk:** ***The Fundamental Limitation on Entanglement Detection***

**Dr. Xiongfeng Ma,  
Tsinghua University**

### **Date & Time:**

**June 15, 2023 (Thurs)  
4:00pm (HKT)**

### **Venue:**

**Zoom & Rm 308, Chow Yei Ching Building, HKU**

### **Remark(s):**

**Mixed mode (online and on-site)**

### **Abstract:**

Entanglement lies at the center of quantum information science and technology as one of the key properties distinguishing quantum mechanics from classical ones. Theoretically, it is widely known that entanglement appears in a system almost surely with random evolution, as long as it is not close to a maximally mixed state. That is, with reasonable control of two subsystems, it is relatively easy to prepare them in an entangled state. In experiments, on the other hand, it is very challenging to detect entanglement for large quantum systems, even if we have good control. In this talk, I shall introduce a mathematical framework to evaluate the effectiveness and efficiency of an entanglement detection method. We explain the above seemingly contradictory facts by showing the trade-off between the effectiveness and efficiency of entanglement detection methods.

### **Speaker information:**

- [1] Liu, Tang, Dai, Liu, Chen, and Ma, Phys. Rev. Lett. 129, 260501, (2022)
- [2] Liu, Liu, Chen, and Ma, Phys. Rev. Lett. 129, 230503, (2022)

### **Speaker information:**

Xiongfeng Ma obtained his B.Sc. degree at Peking University in 2003 and his Ph.D. at the University of Toronto in 2008. In 2012, he joined Tsinghua University. Xiongfeng is currently an associate professor and holds a Changjiang Scholarship. He is an Editorial Board Member of Physical Review Letters. Xiongfeng's primary research interest lies in quantum information science, particularly in quantum cryptography, quantum computing, and quantum foundation. He is one of the main contributors to the decoy-state method, which has become a standard technique for commercial quantum key distribution systems. According to the Scientometric Assessment of Global Publications from 1992 to 2019, Xiongfeng was one of the most productive researchers worldwide in quantum cryptography by ResearchGate.

### **How to join the group meeting:**

#### 1. Zoom link

Time: May 15th, 2023 04:00 PM Hong Kong SAR

Join Zoom Meeting:

<https://hku.zoom.us/j/91780656251?pwd=VnVmbzBmZXVUeWdod3Z1OXJ4YXF4dz09>

Meeting ID: 948 7587 4407

Password: 435489

#### 2..To join in person: Room-308, Chow Yei Ching building.

**All are welcome!**

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