SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING
Website: https://cde.nus.edu.sg/ece

Area: Microelectronic Technologies & Devices

Host: Associate Professor Mankei Tsang

TOPIC	:	**Quantum Semiparametric Estimation for Subdiffraction Incoherent Imaging**
SPEAKER	:	**Mr. Tan Xiaojie** **Graduate Student, ECE Dept, NUS**
DATE	:	**Thursday, 18 May 2023**
TIME	:	**2:00PM to 2:30PM**
VENUE	:	**Join Zoom meeting:** https://nus-sg.zoom.us/j/87418044262?pwd=eXVuT1pnOUUxNjJ1QUtQdVhjc0Fldz09 **Meeting ID: 874 1804 4262** **Passcode: 119957**

ABSTRACT

Inspired by quantum information theory, our group discover that spatial mode demultiplexing (SPADE) measurement scheme can distinguish two incoherent point sources with arbitrary small separation, which reaches the resolution at quantum limit. In this seminar, we discuss a general scenario, where the object is more complicated than point sources. Taking quantum semiparametric model, we obtain a reliable quantum Cramer-Rao bound (QCRB) for the parameter of interests, and compare with the CRB under SPADE scheme. The results indicate SPADE provides a near-quantum-optimal resolution in estimating the corresponding object moment. We also experimentally demonstrate the semiparametric estimation with SPADE consist of a few optical modes, where high signal to noise ratio (SNR) is observed. Potential application of quantum semiparametric estimation, as well as SPADE, ranges from optical precision measurement to subdiffractional object discrimination.

BIOGRAPHY

Mr. Tan Xiaojie is currently pursuing his PhD degree at the Department of Electrical and Computer Engineering, National University of Singapore, supervised by Prof. Mankei Tsang. His research mainly focuses on the application of quantum information in super-resolution optical imaging.

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