Joint CQSE & NCTS Special Seminar

2023
Jan. 13, Friday

TIME Jan. 13, 2023, 14:30~15:30pm
TITLE Quantum computing with silicon MOS quantum dots
SPEAKER Dr. Chih-Hwan Yang (School of Electrical Engineering and Telecommunications, University of New South Wales, Sydney, Australia)
PLACE NCTS Physics Lecture Hall, 4F, Chee-Chun Leung Cosmology Hall, NTU
ONLINE https://nationaltaiwanuniversity-zbn.my.webex.com/

Abstract:

Spin qubits in silicon are excellent candidates for scalable quantum computers [1] due to their long coherence times and the enormous investment in silicon CMOS technology. In this talk, I will walk through the architecture of our SiMOS quantum dots. With combination of isotopically enriched Si 28 substrate and an on-chip electron spin resonance (ESR) microwave line, these quantum dots can be operated as spin qubits [2,3] with high fidelity [4,5]. In addition, I will present our recent experiments on the demonstrating the scalability strengths of SiMOS qubits, including scalable SMART qubit control with global electron spin resonance (ESR) [6], intrinsic electrically driven spin resonance (EDSR) on spin qubits [7] and more.

Reference to publications:
[1] D. D. Awschalom et al. Science 339, 1174 (2013).
[2] M. Veldhorst et al. Nature Nanotechnology 9, 981 (2014).
[3] M. Veldhorst et al. Nature 526, 410 (2015).
[4] C. H. Yang et al. Nature Electronics 2, 151 (2019)
[5] W. Huang et al. Nature 569, 532 (2019).
[6] I. Hansen et al. Applied Physics Reviews 9, 031409 (2022).
[7] W. Gilbert et al. accepted by Nature Nanotechnology (2022)

Biography Brief:

Dr. Chih-Hwan (Henry) Yang is the Head on Quantum Control in the newly start-up company Diraq, and Senior Lecturer in UNSW Sydney, working on silicon quantum dots for quantum computation. He has been designing and running experimental measurements on these devices since 2010 of his PhD degree in UNSW, notably the comprehensive characterisation of a silicon Metal-Oxide-Semiconductor (MOS) based quantum dot that paved the way of becoming a spin qubit platform. His main focus in on achieving high fidelity single spin qubits and two-qubit systems, and demonstrating of high scalability qubit system in silicon.

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