
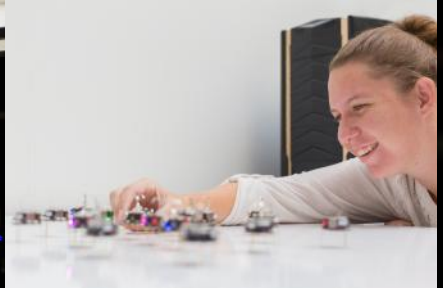


Physics colloquium

A Wavelength Convertible Quantum Memory: Controlled Echo

Byoung Seung Ham
Electrical Engineering and Computer Science
Gwangju Institute of Science and Technology

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Location: **COB1 114**
For more information contact
Lin Tian
ltian@ucmerced.edu

Abstract: Over decades quantum information has been progressed and produced preliminary versions of noisy quantum computing, cryptography, and sensing devices. Due to the inevitable interactions with environments, any qubit should suffer from dephasing effects, resulting in noise limiting its functional capabilities. Although several versions of hundred-qubit-quantum computing hardware have been invented by companies and academia, the quantum supremacy may not be reached unless the noise problem is completely solved. Here, in this talk, I present the quantum coherence control to manipulate ensemble qubits and subsidize the noise via coherence conversion between optical and spin transitions. This technique is quite effective especially to solid states whose spin transitions are inhomogeneously broadened. As a result, the coherence conversion leads to wavelength convertible quantum memories whose storage time is ultralong in the unit of minutes or even hours.

Bio: Professor Byoung Ham completed his PhD from Wayne State University, USA, in 1995 with the thesis of "Experimental study of lasing without population inversion in ruby," After his postdoc at MIT and AFRL, he went back to S. Korea in 1999. Since then, Prof. Ham has led giant research projects in optics and photonics including quantum information. Recently his research interest has been expanded into artificial intelligence to solve the von Neumann bottleneck in digital computations. He is now a director of the center for photon information processing at GIST, S. Korea.