



IBS Center for Molecular Spectroscopy and Dynamics

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## COLLOQUIUM

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- **SPEAKER**

Dr. Jaemin Lim (Institute for Theoretical Physics, Ulm University)

- **TITLE**

Vibronic coherence in energy transport and charge separation

- **ABSTRACT**

Recent advances in nonlinear spectroscopy have revealed the presence of long-lived quantum coherences in molecular systems. Coherent features observed in two-dimensional electronic spectra of light-harvesting systems, including photosynthetic complexes and organic solar cells, have demonstrated the possibility that exciton transport and charge separation in these systems are governed by quantum mechanics in a wave-like manner. In this talk, I will introduce the concept of coherent vibronic coupling that makes coherent electronic motions to be maintained under decohering environments [1]. Then, I will present joint experimental-theoretical studies on macromolecular J-aggregates [2] and conjugated polymers [3] where long-lasting coherences are found to be dominated by coherent vibronic coupling. It will be shown that alternative models, such as correlated noise and incoherent charge separation models, can be ruled out based on experimental data and detailed theoretical analysis. I will show that vibronic coupling also explains coherent features observed in single molecule measurements on LH2 complexes [4], reported in Ref. [5]. Finally, I will present a recent work on quantum control where we aim to reduce the complexity of nonlinear optical responses by using pulse shaping, such as suppressing ground state coherences in 2D electronic spectra [6].

- **DATE AND VENUE**

November 1, 2017 (Wednesday, 5:00 - 6:00 pm)  
Seminar Room 116, KU R&D Center

- **LANGUAGE**

Korean

- **INVITED BY**

Prof. Kyungwon Kwak

\* If you want to have a discussion with Dr. Jaemin Lim or have dinner with him, please contact Prof. Kyungwon Kwak (kkwak@korea.ac.kr).