

電子科学研究所 学術講演会

講演者: **Prof. Karl Börjesson**
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演題: **The influence of exciton-exciton and exciton-photon interactions on molecular photophysics**

会場: 電子科学研究所 1階会議室

日時: 令和 6 年 4 月 15 日(月) 16:30~17:30

概要:

Coupling of the transition dipole moment of an organic chromophore can create new photophysical relaxation pathways and/or change the energetics of the excited states. This presentation introduces the impact of coupling the transition dipole moment of organic chromophores on photophysical pathways and excited state energetics. Three coupling scenarios are introduced: weak exciton coupling facilitating energy transfer, especially through FRET as a multiplicity converter; strong exciton coupling leading to the formation of delocalized J-aggregates with distinct NIR emission characteristics and a breakdown of the energy gap law; and strong light-matter coupling within an optical cavity generating polaritonic states. The discussion encompasses fundamental principles of strong light-matter coupling, detailing how an optical cavity augments the electromagnetic field and providing examples of potential applications. Notably, polaritonic states are explored in the context of red-shifted absorbance and their utilization in organic solar cells to channel excitation energy to charge-transfer states. The presentation concludes by examining transitions between molecular-centered and polaritonic states, focusing on the manipulation of driving forces and their impact on photophysics, particularly the interplay between triplet states and polaritonic states.