



第245回 OPERA研究交流セミナー
第236回 ISIT有機光エレクトロニクス研究特別室セミナー
第303回 未来化学創造センターセミナー



日時: 2024年11月5日(火) 14:00~
場所: ISI棟3階 セミナー室



「Exciton-Polariton Kinetics and Anomalous PLQY Enhancement beyond the Classical Purcell Effect」

Dr. Tomohiro Ishii

Department of Engineering Physics, École Polytechnique de Montréal, Canada

In recent years, theoretical and experimental efforts have focused on exploring how molecule-photon interaction inside microcavities can significantly modify excitonic processes. In particular, exciton-polariton, resulting from the strong coupling between excitons and photons, have potential to manipulate molecular emission process via the reordering of the molecular excited state by the huge Rabi splitting, typically 0.1 to 2.0 eV. In addition, the modified photonic local density of states can change out coupling efficiency and radiative decay rate, which corresponds to the Purcell factor (typically less than 10 in the planar microcavities).

In this talk, I will introduce the molecular kinetics in strongly coupled microcavity [1-6], and discuss the anomalous PLQY enhancement (the factor of 500 at 300K, and 1000 at 10K) inside organic cavities [7].

[1] T. Ishii *et al.*, *Adv. Opt. Mater.* **10**, 2102034, 2022.

[2] T. Ishii *et al.*, *Adv. Opt. Mater.* **9**, 2101048, 2021.

[3] T. Ishii and S. Kéna-Cohen, *Development and Recent Trends in Organic Semiconductors*, CMC Publishing Co.,Ltd., Tokyo.

[4] T. Ishii *et al.*, *Polariton Chemistry*, Wiley, New York City, in press.

[5] T. Ishii, J. B. Pérez-Sánchez *et al.*, *ACS Photonics* 2024, in press.

[6] T. Ishii, F. Herrera *et al.*, to be submitted.

[7] T. Ishii and S. Kéna-Cohen, to be submitted.