第一回量子化学工学セミナー

光と物質の強い相互作用に基づく化学と物質科学の分野において世界的に著名なThomas W. Ebbesen教授（ストラスブール大）をお迎えして講演会を行うことになりました。その関連分野として、基礎工学研究科物性物理工学領域 量子情報・量子光学グループの生田力三准教授、未来物質領域構造ゆらぎダイナミクスグループの五月女光助教にもご講演いただけることになりました。皆様奮ってご参加くださいますようお願い申し上げます。

日程：　２０２３年４月２０日（木）　　**会場：　基礎工学研究科　国際棟セミナー室**

13:50-　Opening (北河康隆准教授)
14:00-　**生田力三 准教授** (物性物理工学領域　量子情報・量子光学グループ)
"Photonic State Manipulation Through Nonlinear Optical Waveguide Resonators”
14:30-　**五月女光 助教** (未来物質領域　構造ゆらぎダイナミクスグループ)
"Exploring Exciton Dynamics and Photoresponses of Molecular Aggregates with Time-Resolved Laser Spectroscopy”
休憩
15:10-　**Prof. Thomas W. Ebbesen** (USIAS & ISIS, University of Strasbourg)
"Hybridizing Light and Matter – Consequences for Chemical and Material Sciences"
16:00-　Closing (岸亮平准教授)

主催：　基礎工学研究科　量子化学工学グループ
共催：　大阪大学QIQB、大阪大学ICS-OTRI、大阪大学SRN-OTRI、基礎工CSRN
連絡先：　量子化学工学グループ　岸 亮平（6266）、北河 康隆（6267）

ICS OTRI
OTRI
Innovative Catalysis
Science Division

sRN Spintronics Research Network Division
CSRN-Osaka

Quantum Chemical Engineering (QCE) Seminar

April 20th (Thu.), 2023
Seminar Room, Engineering Science International Hall (Sigma-Hall)
Graduate School of Engineering Science, Osaka University

13:50- Opening (Dr. Yasutaka Kitagawa, QCE Group)

14:00- **Dr. Rikizo Ikuta** (Graduate School of ES, Osaka University)
"Photonic State Manipulation Through Nonlinear Optical Waveguide Resonators"
14:30- **Dr. Hikaru Sotome** (Graduate School of ES, Osaka University)
"Exploring Exciton Dynamics and Photoresponses of Molecular Aggregates with Time-Resolved Laser Spectroscopy"
Break
15:10- **Prof. Thomas W. Ebbesen** (USIAS & ISIS, University of Strasbourg)
"Hybridizing Light and Matter – Consequences for Chemical and Material Sciences"

16:00- Closing (Dr. Ryohei Kishi, QCE Group)

Contact: Quantum Chemical Engineering (QCE) Group
Graduate School of Engineering Science, Osaka University
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Hybridizing Light and Matter – Consequences for Chemical and Material Sciences

Thomas W. Ebbesen
USIAS & ISIS, University of Strasbourg, France

The demonstration that material and chemical properties can be manipulated by using hybrid light-matter states has stimulated considerable interest over the past decade [1,2]. Such hybrid light-matter states can be generated by strongly coupling the electronic or the vibrational transitions of a material, to the spatially confined electromagnetic field of an optical resonator. Most importantly, this occurs even in the dark because the coupling involves the zero-pointelectromagnetic fluctuations of the resonator. After introducing the fundamental concepts, examples of modified properties of strongly coupled systems, such as chemical reactivity, self-assembly, conductivity, energy transfer and magnetism will be given to illustrate the broad potential of light-matter states.

Reviews: [1] F.J. Garcia Vidal, C. Ciuti, T.W. Ebbesen, *Science* **2021**, 373, eabd336
[2] K. Nagarajan, A. Thomas, T.W. Ebbesen, *J. Am. Chem. Soc.* **2021**, 141, 16877.

Prof. Thomas W. Ebbesen is a physical chemist born in Oslo, Norway. He was educated in the United States and France, receiving his bachelor degree from Oberlin College (USA) and his PhD from the Curie University in Paris. He then did research in both the US and Japan, most notably at NEC, before returning to France in 1999 to help build a new institute (ISIS) at the University of Strasbourg. He is currently the head of the Center for Frontier Research in Chemistry and the Strasbourg Institute for Advanced Studies (www.usias.fr). He holds the chair of physical chemistry of light-matter interactions. The author of many papers and patents, he has received numerous awards for his pioneering research including the 2014 Kavli Prize in Nanoscience.