NAGOYA UNIVERSITY

Nagoya University-Jilin University Online Program

March 18 – March 26, 2021

(Orientation: March 11, 2021)

Schedule

Orientation	16:00-17:00 (CST), Thursday, March 11, 2021

Session	Date	Time	Laboratory	Lecture title
Session 1	March 18, 2021	15:30-17:00 (CST)	OOI Laboratory	Behavior of Molecules: From Catalysis to Biological Functions
Session 2	March 19, 2021	13:30-15:00 (CST)	KISHIDA Laboratory	Introduction to ultrafast optical measurements
Session 3		15:30-17:00 (CST)	MASUBUCHI Laboratory	Introduction to rheology
Session 4	March 20, 2021	13:30-15:00 (CST)	NOJIRI Laboratory	Particle Physics and Gravity
Session 5	March 22, 2021	9:30-11:00 (CST)	SEKI Laboratory	Photoalignment of Liquid Crystals
Session 6		13:30-15:00 (CST)	SAITOH Laboratory	Seeing nano by innovative electron beams
Session 7	March 23, 2021	13:30-15:00 (CST)	KUSANO Laboratory	Introduction to Project for Solar-Terrestrial Environment Prediction (PSTEP)
Session 8		15:30-17:00 (CST)	AWAGA Laboratory	物性化学研究室介绍:分子化学与物理性质的交融
Session 9	March 24, 2021	13:30-15:00 (CST)	IKUTA Laboratory	The fascinating world of superconductivity and functional materials
Session 10	March 25, 2021	13:30-15:00 (CST)	ZHANG Laboratory	张绍良研究室的研究介绍
Session 11		15:30-17:00 (CST)	HISHIKAWA Laboratory	Ultrafast reaction imaging and control by ultrashort intense laser pulses
Session 12	March 26, 2021	9:30-11:00 (CST)	SASAI Laboratory	3D chromatin organization: A physicists perspective
Session 13		13:30-15:00 (CST)	TANAKA & KAWAGUCHI Laboratory	Physics of ultra-cold Atoms --manipulating gaseous atoms with light--

NAGOYA UNIVERSITY

OOI Laboratory

大井　貴史 教授/ Prof. OOI, Takashi

Laboratory for the Chemistry of Organic Reactions, Ooi Group, Department of Molecular and Macromolecular Chemistry, Graduate School of Engineering

Session 1

15:30-17:00 (CST), March 18, 2021

Title

Behavior of Molecules: From Catalysis to Biological Functions

Abstract

Molecules are the smallest units responsible for functions and are inherently multidisciplinary as fields that deal with structurally well-defined molecular entities are diverse. Synthetic chemistry is essential for the assembly of molecules by connecting or breaking bonds in a predictable manner. Such endeavor always involves the transformations of certain carbon feedstock to desired products. In developing ideal systems for executing this fundamental process, catalysts play a pivotal role. In this context, we have designed and synthesized a series of structurally novel organic molecules, particularly chiral organic ion pairs, and succeeded in eliciting their unique functions as molecular catalysts through rational structural modifications, thereby leading to achieve highly selective bond-forming reactions based on the precise control of ionic species. In this lecture, I will present the details of this research stream, starting from the inherent value of organic molecules. I will also discuss about our collaborative research with biologists at ITbM, such as molecular-level approach to combat Striga, a parasitic plant causing huge damage in Africa agriculture.

Website

http://www.chembio.nagoya-u.ac.jp/labhp/organic3/index.html

NAGOYA UNIVERSITY

KISHIDA Laboratory

Session 2

13:30-15:00 (CST), March 19, 2021

岸田 英夫 教授/ Prof. KISHIDA, Hideo

Research Group of Quantum Physics and Engineering (Optical Physics), Department of Applied Physics, Graduate School of Engineering

Title

Introduction to ultrafast optical measurements

Abstract

How short a time is one moment? How short light pulses are used in our daily life? In this lecture, we will introduce some examples of short light pulses around us and femtosecond pulses used in research.

Website

http://www.op.ap.pse.nagoya-u.ac.jp/

NAGOYA UNIVERSITY

MASUBUCHI Laboratory

増渕 雄一 教授/ Prof. MASUBUCHI, Yuichi

Research Group for Rheology Physics, Department of Material Physics, Graduate School of Engineering

Session 3

15:30-17:00 (CST), March 19, 2021

Title

Introduction to rheology

Abstract

There are lots of matters that are something between liquid and solid. For instance, toothpaste, lipsticks, creams cannot be clearly discriminated into either liquid or solid. These materials are called soft-matters, and the science for the dynamics of soft-matters is rheology. Rheology is an interdisciplinary science related to mechanical engineering, chemistry, food industry, biology, etc. In this lecture, I wish to introduce the fun of rheology.

Website

http://rheology.jp/nagoya/

NAGOYA UNIVERSITY

NOJIRI Laboratory

野尻　伸一 教授/ Prof. NOJIRI, Shin'ichi

Gravitational Theory research group (QG Lab.)

Session 4

13:30-15:00 (CST),

March 20, 2021

Title

Particle Physics and Gravity

Abstract

I will talk about the overview of particle physics, gravity theories, and the related activities in Nagoya University. I will also introduce the Kobayashi-Maskawa Institute for the Origin of Particles and the Universe (KMI) of Nagoya University, which was founded after Drs. Kobayashi and Maskawa were awarded the Nobel Prize in Physics in 2008.

Website

https://sites.google.com/view/qglab/

NAGOYA UNIVERSITY

SEKI Laboratory

関　隆広 教授/ Prof.　SEKI, Takahiro

Macromolecular Assembly Chemistry Laboratory, Department of Molecular & Macromolecular Chemistry, Graduate School of Engineering

Session 5

9:30-11:00 (CST),

March 22, 2021

Title

Photoalignment of Liquid Crystals

Abstract

The photoalignment technology of liquid crystalline (LC) materials has become an important strategy in the industrial fabrication of LC display panels. This lecture will introduce the principle and history of photoalignment technology, and our recent investigations on the orientation of LC polymer thin films utilizing this light-assisted approach.

Website

http://www.chembio.nagoya-u.ac.jp/labhp/polymer3/index-j.html

NAGOYA UNIVERSITY

SAITOH Laboratory

齋藤　晃 教授/ Prof. SAITOH, Koh

Advanced Measurement Technology Center, Institute of Material and Systems for Sustainability

Session 6

13:30-15:00 (CST),

March 22, 2021

Title

Seeing nano by innovative electron beams

Abstract

We have developed next-generation electron microscopes using innovative electron beams such as electron vortex beams and spin polarized beams. Our newly developed electron microscopes show the world's highest level of energy- and time-resolutions, and have been applied to the visualization of high-speed phenomena in nanoscale. Also, we have performed characterization of actual materials such as defect analysis of power devices and operand TEM observation of battery materials by making best use of various electron microscopy techniques.

Website

http://sirius.imass.nagoya-u.ac.jp/

NAGOYA UNIVERSITY

KUSANO Laboratory

草野 完也 教授/ Prof. KUSANO, Kanya

Institute for Space-Earth Environmental Research (ISEE)

Session 7

13:30-15:00 (CST), March 23, 2021

Title

Introduction to Project for Solar-Terrestrial Environment Prediction (PSTEP)

Abstract

Solar eruptions, e.g., giant solar flares, may impact the global environment and socioeconomic systems. However, the mechanisms for solar eruptions and the subsequent processes have not yet been fully understood. Thus, modern society supported by advanced information systems is at risk from severe space weather disturbances. Project for Solar-Terrestrial Environment Prediction (PSTEP, https://www.pstep.jp/greeting_en) was conducted to improve our understanding and predictability of solar-terrestrial environment. In this lecture we introduce the research results of PSTEP.

Website

http://www.isee.nagoya-u.ac.jp/~kusano/

NAGOYA UNIVERSITY

Session 8

15:30-17:00 (CST), March 23,

AWAGA Laboratory

阿波賀 邦夫 教授/ Prof. AWAGA, Kunio

Center for Materials Science Laboratory of advanced materials,
Graduate School of Science / Research

物性化学研究室介绍：分子化学与物理性质的交融

阿波贺邦夫教授带领的物性化学研究室是一支致力于探索分子材料及其衍生器件的物理性质及应用的研究团队。团队的研究兴趣集中于具有特殊的电子或自旋结构的有机小分子，功能性高分子或金属有机配合物等材料，着力于表征和理解它们的物理性质，如导电性，光电性能，磁性等，并基于它们特殊的物理性质开发与改进功能性器件。在本次报告中，团队成员将对本研究室正在进行的如下研究方向进行简单的介绍。

研究方向 1. 功能性金属有机框架化合物（MOF）的开发以及其特殊的电学、磁学性质。（介绍人：张中岳讲师）
研究简介：一直以来，金属有机框架化合物都因其极易调控的结构与优异的吸附，分离和催化性能受到广泛关注，然而，对于这一类化合物的电，磁学研究尚处于发展之中。本团队的研究专注于开发具有氧化还原性质以及特殊电学、磁学性质的金属有机框架化合物，并通过化学与晶体工程学合成技术调控其结构，从而调节获得优异的物理性能。

研究方向 2. 原位电化学表征技术对材料电化学过程中电子结构演化的观测。（介绍人：陈棋 博士三年级生）
研究简介：电化学过程是电池或电催化器件应用中的核心化学过程，但对于绝大多数材料来说，电化学过程中的电子结构变化并未被仔细表征，从而对于大多数储能材料，电化学的机理并不十分清晰。本研究室利用一系列原位电化学表征技术，如磁性测量，EPR，EXAFS 等技术表征储能材料的中间态，从而对材料的电子结构在电化学过程中的演化进行观测。

研究方向 3. 高速响应有机光电器件的开发 （介绍人：横仓 圣也 博士）
研究简介：有机光电器件广泛存在于现代电子工业之中。与传统研究追求高量子效率不同，本研究室致力于利用有机半导体分子材料的光致极化行为，并利用特殊的 MISIM 器件结构将极化放大，从而在不产生界面电荷转移的情况下得到具备高速响应以及长寿命特性的有机光电器件。

研究方向 4. 分子基碳同构体的开发与能带结构 （介绍人：珠玖 良昭 博士）
研究简介：固体分子材料的能带结构高度依赖于其堆积方式以及结构的拓扑性，近年来，与碳材料结构同拓扑的材料被固体物理理论预测为具有独特的能带结构以及拓扑相关的物理性质。基于此，通过设计分子结构，本研究室试图开发一系列具备独特拓扑结构（如蜂巢,Gyroid 结构）的固态分子材料，并探索其特殊拓扑结构衍生的独特能带结构以及相应的固体物理性质。

Website
http://advmat.chem.nagoya-u.ac.jp/

NAGOYA UNIVERSITY

IKUTA Laboratory

生田　博志 教授/ Prof. IKUTA, Hiroshi

Electronic Functional Materials Research Group, Department of Material Physics, Graduate School of Engineering

Session 9

13:30-15:00 (CST), March 24, 2021

Title

The fascinating world of superconductivity and functional materials

Abstract

Our research group covers various topics in the field of materials physics, such as high-temperature superconductivity, topological materials, nitrides, and pnictogen materials. Superconductivity is a curious and fascinating phenomenon that has been attracting inexhaustible research interest more than a century. In this online lecture, we will explain the basic properties of superconductors and introduce our research activities on these materials. If time allows, we will also briefly talk about the other research topics in our group.

Website

http://iku.xtal.nagoya-u.ac.jp/index.html

NAGOYA UNIVERSITY

ZHANG Laboratory

張 紹良 教授/ Prof. ZHNAG, Shao-liang

Department of Applied Physics, Graduate School of Engineering

Session 10

13:30-15:00 (CST),

March 25, 2021

Title

张绍良研究室的研究介绍

Abstract

介绍名古屋大学应用物理学专业张绍良研究室所从事的以数学工程研究为中心的各种研究

Website

http://na.nuap.nagoya-u.ac.jp/

NAGOYA UNIVERSITY

Session 11

15:30-17:00 (CST), March 25, 2021

HISHIKAWA Laboratory

菱川 明栄 教授/ Prof. HISHIKAWA, Akiyoshi

Photo-Physical Chemistry Laboratory, Department of Chemistry, Graduate School of Science

Title

Ultrafast reaction imaging and control by ultrashort intense laser pulses

Abstract

Molecules irradiated with intense laser pulses (field intensity ~10^15 W/cm^2) exhibit a variety of characteristic processes, such as tunneling ionization, electron rescattering , high-order harmonics generation and Coulomb explosion, that cannot be seen in a weak light field. These features have attracted attention in the last decades as they provide unique approaches to visualize and manipulate ultrafast dynamics of atoms and molecules. Here we discuss molecular processes in intense laser fields, with focuses on the applications to ultrafast imaging and control of reaction dynamics.

Website

http://photon.chem.nagoya-u.ac.jp/

NAGOYA UNIVERSITY

SASAI Laboratory

笹井 理生 教授/ Prof. SASAI, Masaki

Theoretical Biological Physics Laboratory, Department of Applied Physics, Graduate School of Engineering

Session 12

9:30-11:00 (CST),

March 26, 2021

Title

3D chromatin organization: A physicists perspective

Abstract

Though we know a lot about the DNA structure, we are only at the very beginning of understanding chromatin organization in a live cell. Chromatin organization in live cells are highly dynamic and yet very robust in their functioning. The chromatin is known to have a hierarchical packing structure with a plethora of assembling factors and enzymes that coordinate among themselves in the presence of cellular noise. My talk will be an overview of the above issues from the standpoint of statistical physics.

Speaker:

Dr. S.S. Ashwin (Designated Assistant Professor)

Website

http://www.tbp.cse.nagoya-u.ac.jp

NAGOYA UNIVERSITY

TANAKA & KAWAGUCHI

Laboratory

田仲 由喜夫 教授/ Prof. TANAKA, Yukio

川口 由紀 教授/ Prof. KAWAGUCHI, Yuki

Research Group of Quantum Physics and Engineering (Condensed Matter Engineering), Department of Applied Physics, Graduate School of Engineering

Session 13

13:30-15:00 (CST), March 26, 2021

Title

Physics of ultra-cold Atoms --manipulating gaseous atoms with light --

Abstract

Our group studies various quantum phenomena that occur in systems with a macroscopic number of particles, such as superconductivity and magnetism.
Similar phenomena also occur with highly controlled gaseous atoms at ultra-low temperature. In this lecture, we will focus on the system of
cold atoms and explain the details of the system.

Website

http://www.rover.nuap.nagoya-u.ac.jp/