

Fritz-Haber-Institut der Max-Planck-Gesellschaft

Physikalische Chemie — Direktor: Prof. Dr. Martin Wolf



MAX-PLANCK-GESellschaft

## Special Seminar:

**Thursday, September 7, 2017, at 11:00 a.m. ;**

— all are invited to meet at around 10:40 for a chat with coffee & cookies —

**Dr. Ryuichi Arafune**      Surface Quantum Phase Materials Group,  
International Center for Materials Nanoarchitectonics,  
National Institute for Materials Science,  
Tsukuba, Japan.

## **Spintexture in image potential states and it's application to opto-spintronics**

PC Seminar Room **G2.06**, Building G, Faradayweg 4.

T. Kumagai

### Abstract:

Opto-spintronics, in which the electronic spin polarization is controlled by light, is a new and fascinating branch of spintronics. Highly accurate and fast control of electron spins by utilizing light is expected. Furthermore, optical approach enable us to manipulate the spin without magnetic materials. The spin-orbit interaction in the photoexcited (unoccupied) states is a key mechanism to understand the spin-manipulation by light. Despite its importance, the spin-texture due to SOI in the unoccupied states have hardly been measured.

In this talk, I will show our recent results about the spin-texture of the image potential states, which is the representative unoccupied state at surfaces, measured by using two-photon photoemission (2PPE) spectroscopy. First, I'll demonstrate that the high resolved 2PPE data reveals the Rashba-type spin splitting in image potential states as well as the Shockley surface states in occupied region. And we have found that the spin-textures reverse in the high order ( $n \geq 2$ ) image potential states. Then, switching the spin-related current by light will be spectroscopically presented..