



Birck Nanotechnology Center

BIO: Dr. Shimpei Ono is working at Central Research Institute of Electric Power Industry as senior research scientist and has been involved for the last 10 years in the research of novel electronics with ionic liquids. He is also a visiting professor at the University of Grenoble Alps within the framework of Chair of Excellence program with LANEF.

Dr. Shimpei Ono Seminar "Development of iontronics"

Monday, December 4th, 2017

3:00pm – 4:00pm

BRK 2001

ABSTRACT: Electric field control of charge carrier density has long been a key technology to tune the physical properties of condensed matter, exploring the modern semiconductor industry. One of the big challenges is to increase the maximum attainable carrier density, however it is limited by the quality of gate dielectrics. In this talk, I'm going to show the novel technique to modulate carrier density making use of ionic liquid electrolytes. With electrolyte gating, we can modulate up to $10^{15}/\text{cm}^2$ of carrier density at the interface which is 2 orders of magnitude larger than conventional gate dielectrics and demonstrate that we can indeed control metal-to-insulator and ferromagnetic-paramagnetic transition by electric-field effect doping. I also will show our recent progress (energy harvester and light emitting device) using ionic liquid electrolytes.