

Fritz-Haber-Institut der Max-Planck-Gesellschaft

Physikalische Chemie — Direktor: Prof. Dr. Martin Wolf



MAX-PLANCK-GESellschaft

## Department Seminar:

**Tuesday, October 29, 2019, at 2:00 p.m.;**

— all are invited to meet at around 1:40 for a chat with coffee & cookies —

**Prof. Gary A. Attard**

The Oliver Lodge,  
Department of Physics,  
University of Liverpool, UK.

## **The slowly-evolving picture of the Pt{110} electrode surface: Is there still something new to learn from single crystal platinum voltammetry?**

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

Y. Tong

### Abstract:

In this lecture, it will be asserted that our understanding of the surface structure of “well-defined” Pt{110} is still far from complete. It is shown that depending on the cooling environment following flame-annealing, several different structural phases may be identified corresponding to (1x1) and variously disordered (1x1) and (1x2) reconstructed surface phases. Furthermore, by utilising stepped Pt{110} electrodes together with CO charge-displacement measurements it is suggested that one may associate “local” values of the potential of zero charge to each of the voltammetric peaks. The consequences of this assertion for the interpretation of the multiplicity of voltammetric curves displayed by *all* Pt{hkl} electrodes will be discussed. From this fundamental perspective, it will then be demonstrated how nitrate reduction may be used as a quantitative probe of Pt{110}-(1x1) facets present at a Pt nanoparticle. Thus, combined with measurements of other surface site specific redox states to measure the abundance of Pt{111} and Pt{100} sites, a very complete picture of terrace site distributions at Pt nanoparticles may be determined via purely electrochemical approaches..