

Mittwoch, 1. März 2017, um 16:00 Uhr

Hörsaal D (Zentralbau Chemie) – außerplanmäßiger Termin

Sprecherin: Archana Raja, Ph.D.

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**Thema: Electrons and excitons at
nanoscale interfaces**

Abstract:

Atomically thin quasi-two-dimensional materials like graphene and transition metal dichalcogenide (TMDC) layers exhibit extraordinary optical and electrical properties. They have not only been used as testing grounds for fundamental research but have also shown promise for their viability in nanoscale optoelectronics and photovoltaics. In practice, seldom are these materials used in isolation, and are often part of a multi-component heterostructure. The environment in which the nanomaterial resides strongly influences its electronic properties. I will discuss our results on the effect of the dielectric neighborhood on electrons and bound electron-hole pairs or “excitons” at the interface of nanostructures, as studied through optical spectroscopy. The talk will cover the following topics:

- Non-invasive bandgap engineering of 2D semiconductor TMDCs by tuning the dielectric environment rather than the material itself.
- The unusual dependence of energy transfer rates to 2D materials from zero-dimensional semiconducting quantum dots.¹

1. Raja et al. Energy Transfer from Quantum Dots to Graphene and MoS₂: The Role of Absorption and Screening in Two-Dimensional Materials. *Nano Lett.* **16**, 2328–2333 (2016).

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