Einladung zum Seminarvortrag

Freitag, 15. Juli 2016, 10:00 Uhr
Seminarraum Lst Weiss, 8.1.09

Dr. Akimitsu Narita
Max Planck-Institut, Mainz

“Structurally Defined Graphene Nanoribbons: Bottom-Up Synthesis, Characterizations, and Device Fabrication”

In contrast to the zero-bandgap graphene, laterally confined graphene nanoribbons (GNRs) possess open bandgaps, which render them highly interesting for the nanoelectronic and optoelectronic applications. Theoretical and experimental studies have revealed that the properties of the GNRs are defined by their structures, in particular the width and the edge configuration. The precise control of the GNR structures is thus essential to reproducibly obtain desired optical and electronic properties. Nevertheless, the required precision cannot be achieved by the predominant “top-down” fabrication methods, such as lithographic “cutting” of graphene sheets and “unzipping” of carbon nanotubes. In this talk, I will present our “bottom-up” approach for the synthesis of structurally defined GNRs,\textsuperscript{1,2} which can be performed “in solution” by the conventional synthetic chemistry\textsuperscript{3–5} as well as “on surface” using the modern techniques in physics.\textsuperscript{6} Moreover, modulation of the bandgap has been achieved by changing the GNR structure,\textsuperscript{1} e.g., lateral extension of the GNR to the width of $\sim 2$ nm lowered optical bandgap down to $\sim 1.2$ eV.\textsuperscript{4} Solution-synthesized GNRs could be longer than 600 nm and liquid-phase processable with the peripheral alkyl chains,\textsuperscript{3} which enabled fabrication of transistor devices with GNR films as well as on isolated GNR strands.\textsuperscript{7} Moreover, GNRs prepared on metal surfaces could be transferred to other substrates, which demonstrated better device characteristics, depending on the bandgap of GNRs. Narrow GNRs with strong absorption in the visible region further displayed interesting photophysical properties such as exciton-exciton annihilation and stimulated emission,\textsuperscript{8} marking their potential also for applications in optoelectronic and photonic devices.

Gastgeber: Dr. Jonathan Eroms

Im Anschluss: Mastervortrag von Herrn Andreas Lex (UR)
"Transport-measurements on bottom-up synthesized Graphene-Nanoribbons"