
O 24: Invited Talk (Rudolf M. Tromp)

Time: Tuesday 10:15–11:00

Location: TRE Phy

Invited Talk

O 24.1 Tue 10:15 TRE Phy

Low Energy Electron Microscopy Studies of Thin Film Graphene Growth and Properties — ●RUDOLF M. TROMP —
IBM T.J. Watson Research Center, 1101 Kitchawan Road, Yorktown Heights, NY 10598, USA

We have used in-situ Low Energy Electron Microscopy (LEEM) and Photo Electron Emission Microscopy (PEEM) to study the growth and properties of thin graphene films on SiC as well as metallic substrates. These methods enable us to follow the growth at temperatures up to 1600 C, and in the presence of background gases up to 0.1 mTorr, in real time and with high spatial resolution, providing valuable insights into the growth processes. The intensity of the Low Energy Electron

Diffraction (LEED) beams as a function of incident energy provides detailed atomic structure information, with a spatial resolution of just a few nanometers. The electronic structure can be accessed by energy and momentum resolved photo electron spectroscopy and microscopy, as well as spatially resolved Electron Energy Loss Spectroscopy. For instance, we find that the electronic structure of the first graphene layer depends sensitively on the electronic structure of the underlying substrate interface. Thus, LEEM/PEEM experiments give a comprehensive view of these thin films, including growth, morphology, atomic, as well as electronic structure. Combining LEEM with multiprobe Scanning Tunneling Microscopy has additionally allowed us to study electronic transport on the nanoscale, revealing the effect of defects such as atomic steps.