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מכון אילזה כ"ץ למדע וטכנולוגיה בתחום הננומטרי
Ilse Katz Institute for Nanoscale Science and Technology

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IKI Auditorium, Building 51, room 015

Strategies of imaging low-dimensional electron-beam-sensitive objects with low-voltage aberration-corrected TEM

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Abstract:

Structural and electronic properties of different low-dimensional electron-beam-sensitive crystalline (ion-implanted graphene, MoS_2, $MoSe_2$, SiO_2, CN, square water, transition-metal clusters) and amorphous (monolayer carbon, SiO_2) objects are obtained by analytical low-voltage aberration-corrected transmission electron microscopy following three main strategies:

(1) Theory and image processing: For exact calculation of the contrast of dose-limited high-resolution TEM images for low-Z materials at low voltages, image theory and image processing needs to be improved taking into account elastic and inelastic scattering.

(2) Sample preparation: We demonstrate our method to clean graphene. We show that sandwiching clean radiation-sensitive low-dimensional objects in-between two graphene layers or embedding them into single-walled carbon nanotubes allows to reduce electron-induced damage of the objects.

(3) Low-voltage transmission electron microscope: We outline our unique voltage-tuneable low-voltage (20-80kV) spherical and chromatic aberration-corrected TEM and show first results obtained from its prototype.