

School of Physics, Peking University

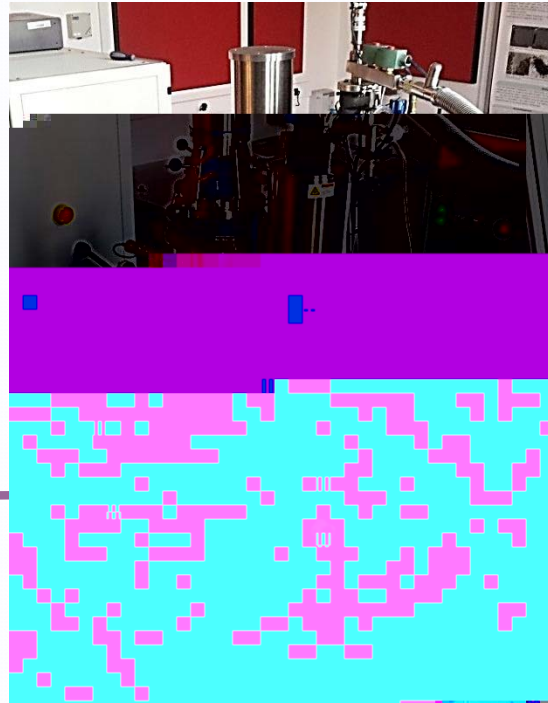
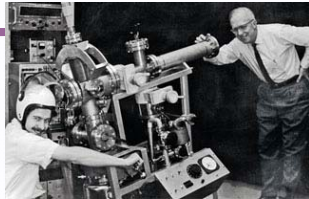
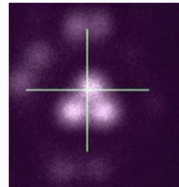
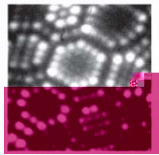


Helium-ion Microscopy *for Graphene Nanodevices*

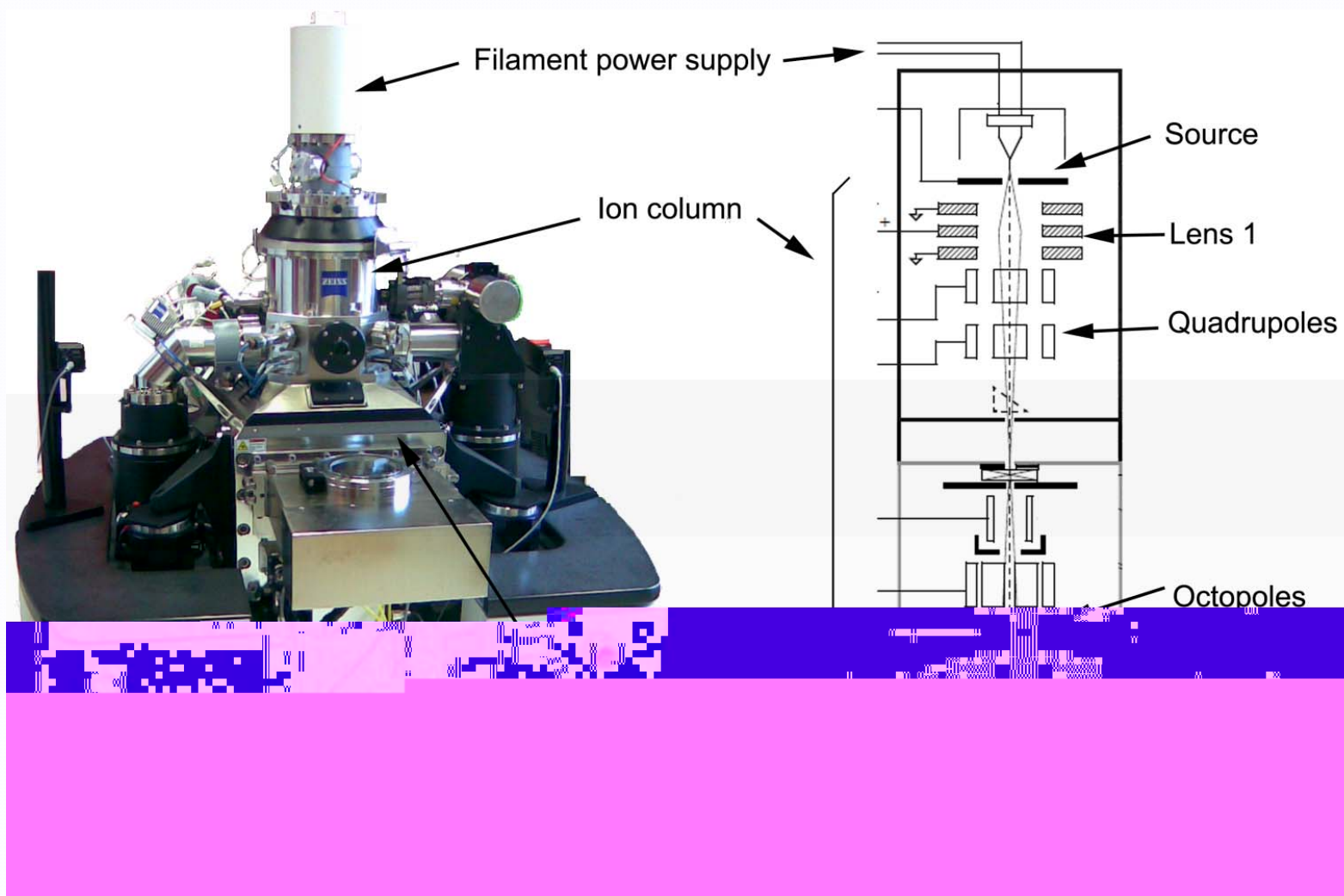
Trinity College Dublin, Ireland



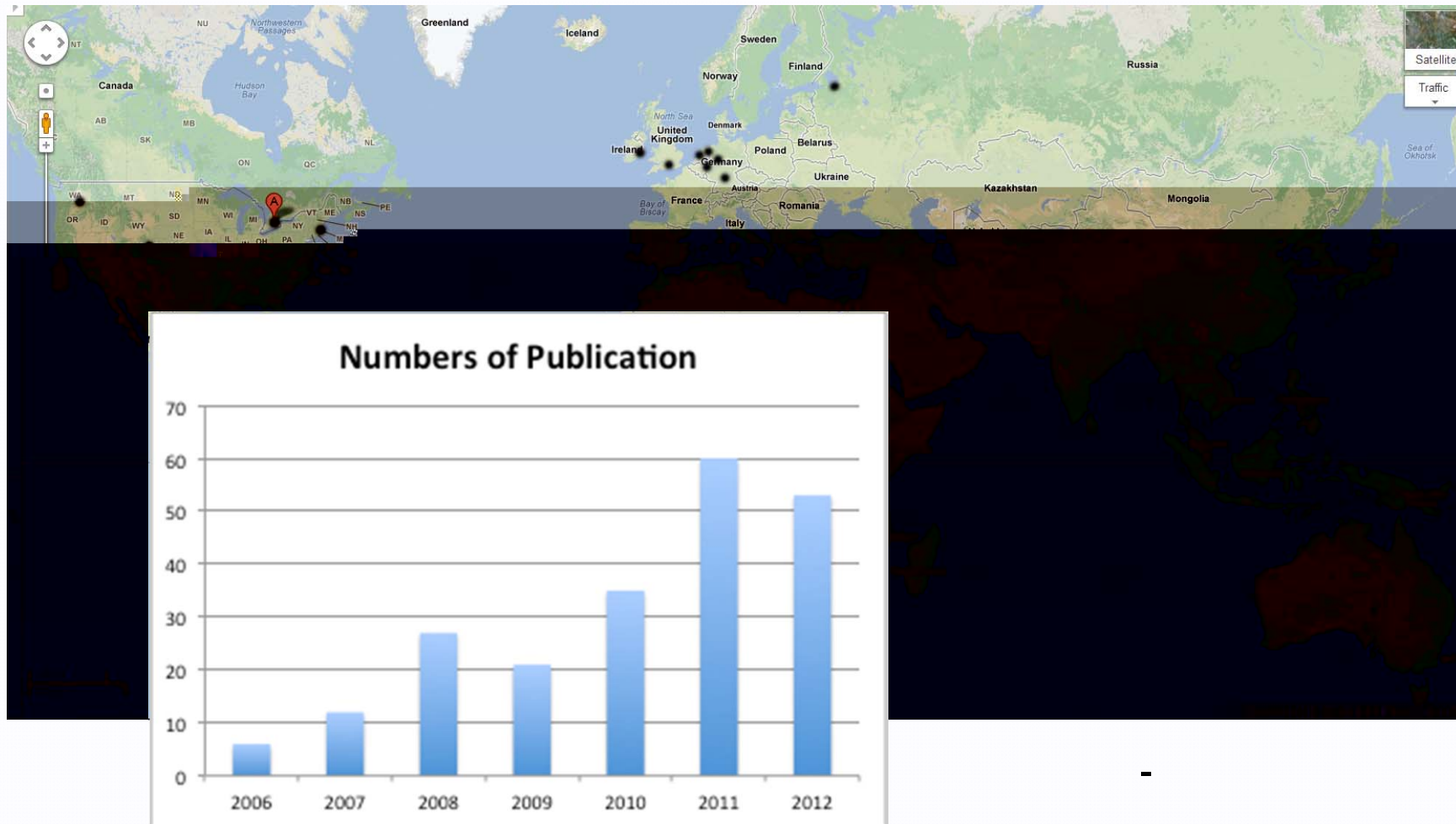
The Helium-ion “Microscope”



How does the HIM works?



Current status – General Information



What can it do? Better or worse?



Resolution

Field of View

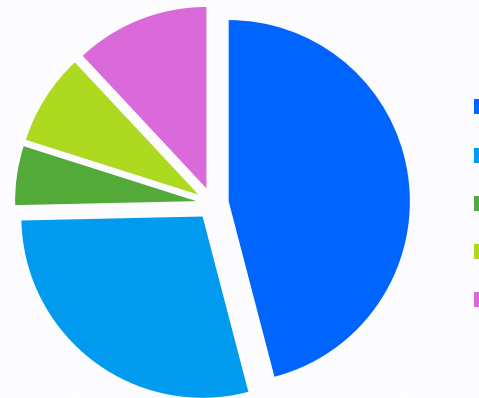
Energy Spread

Beam current

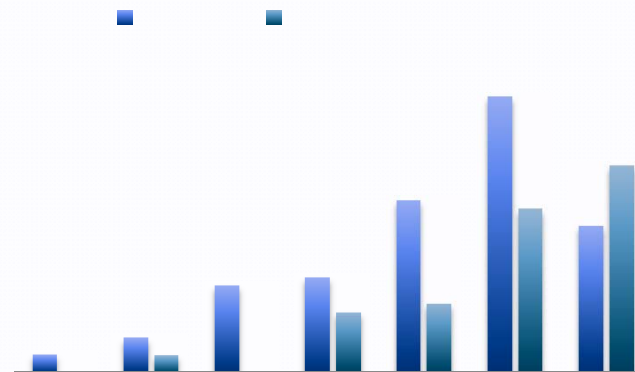
Sample size

Detectors

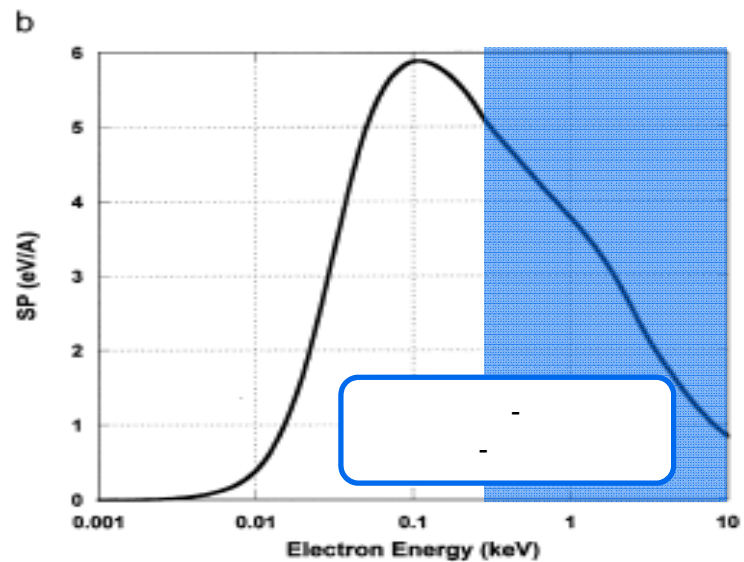
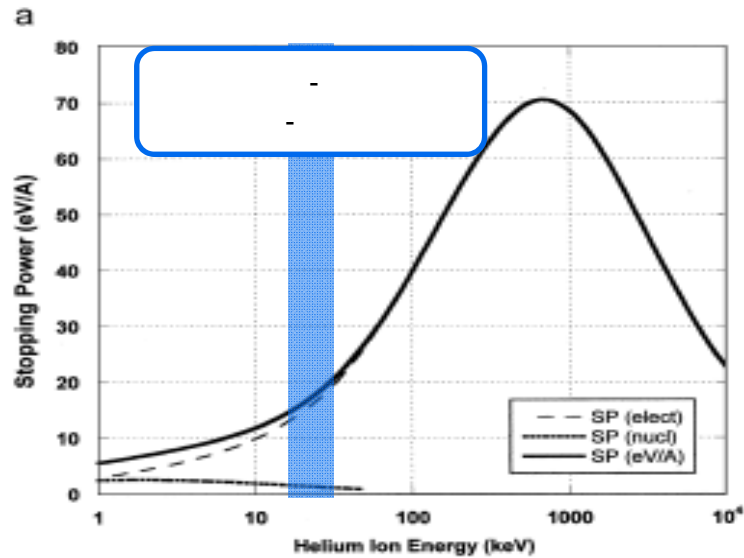
Attachments



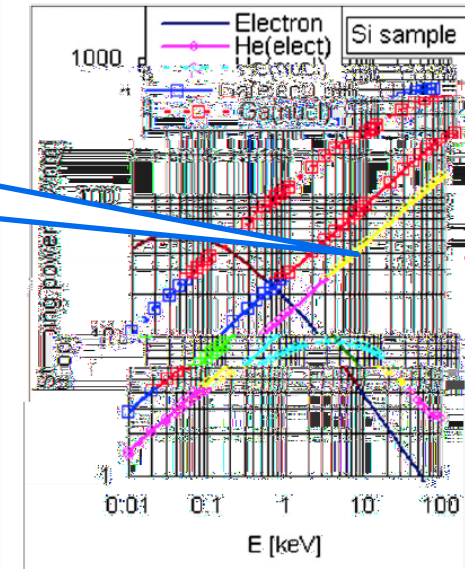
Imaging vs. Fabrication



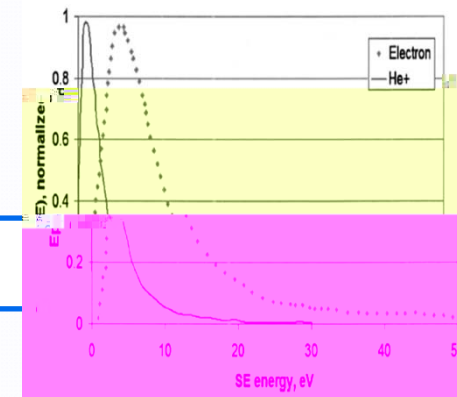
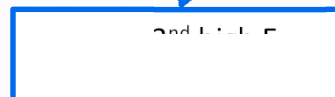
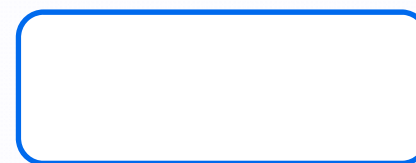
Stopping power and signal generation



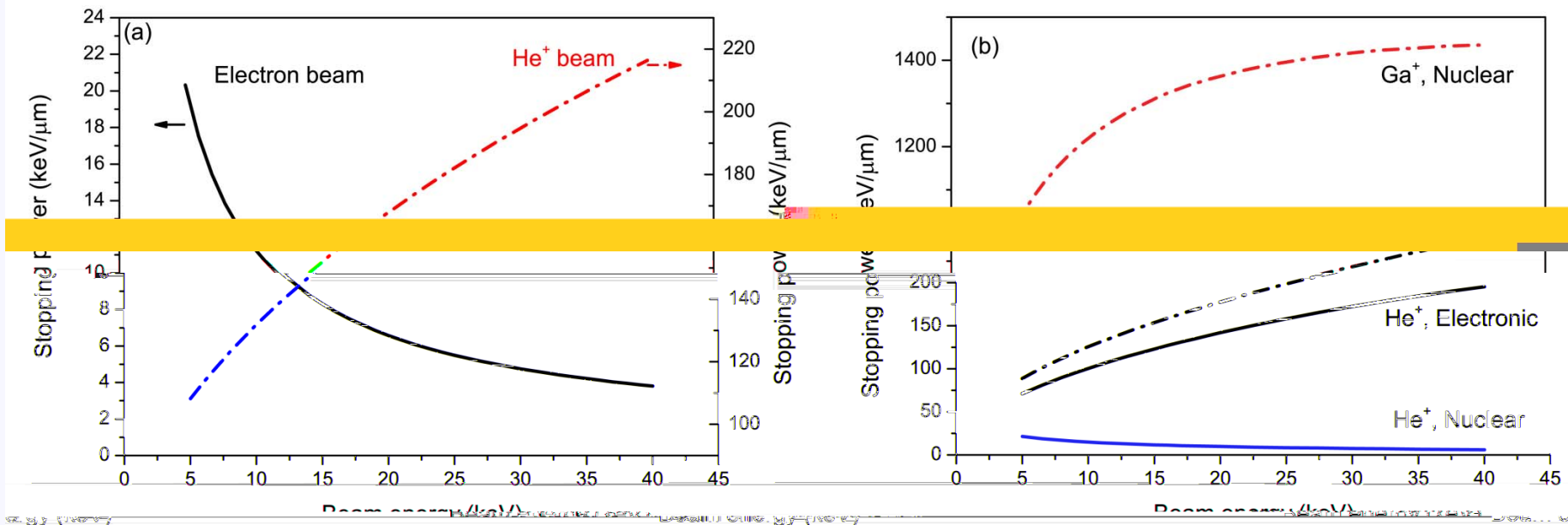
Yield of 2nd electrons



Energy spectrum of 2nd electrons:



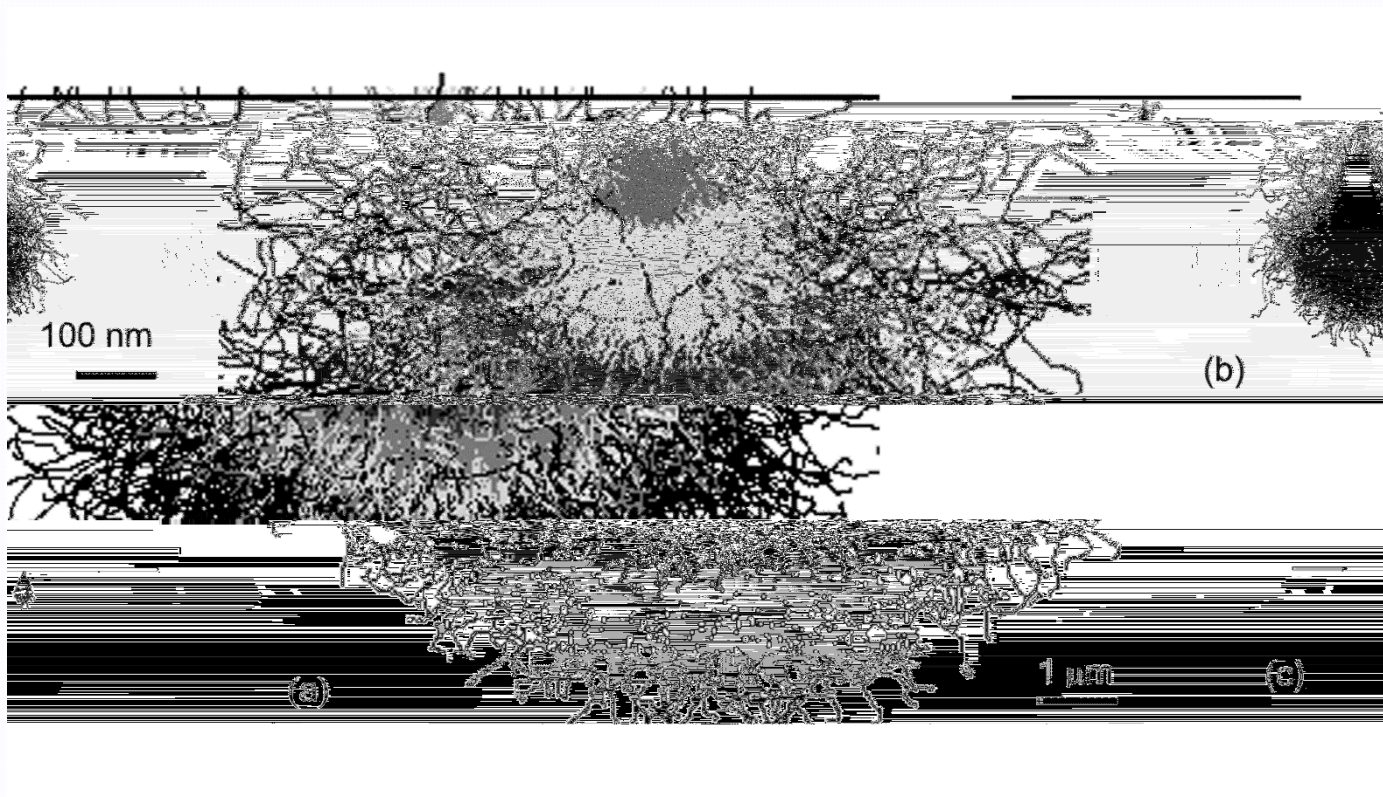
Interaction between He^+ and Carbon



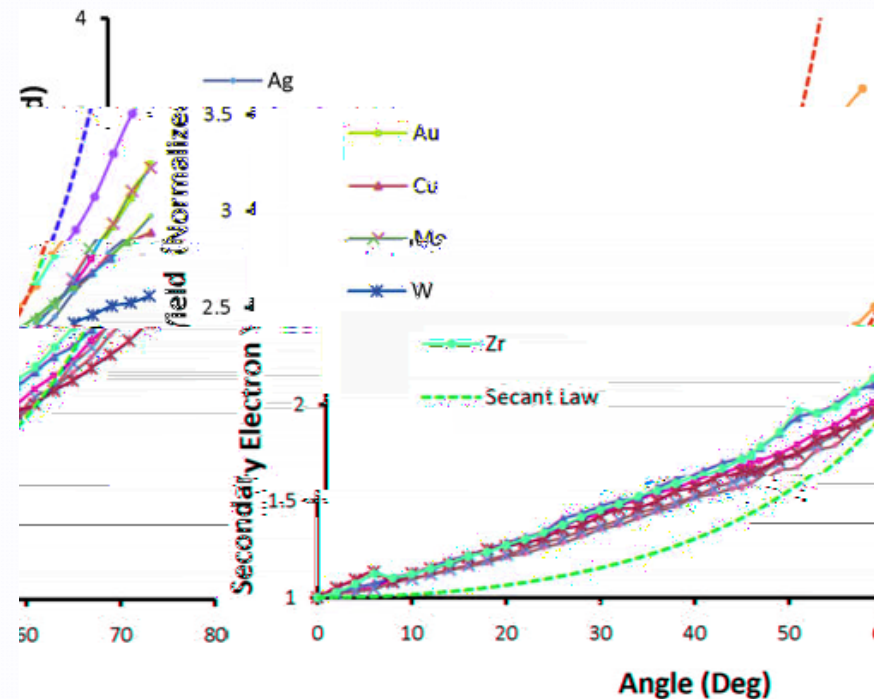
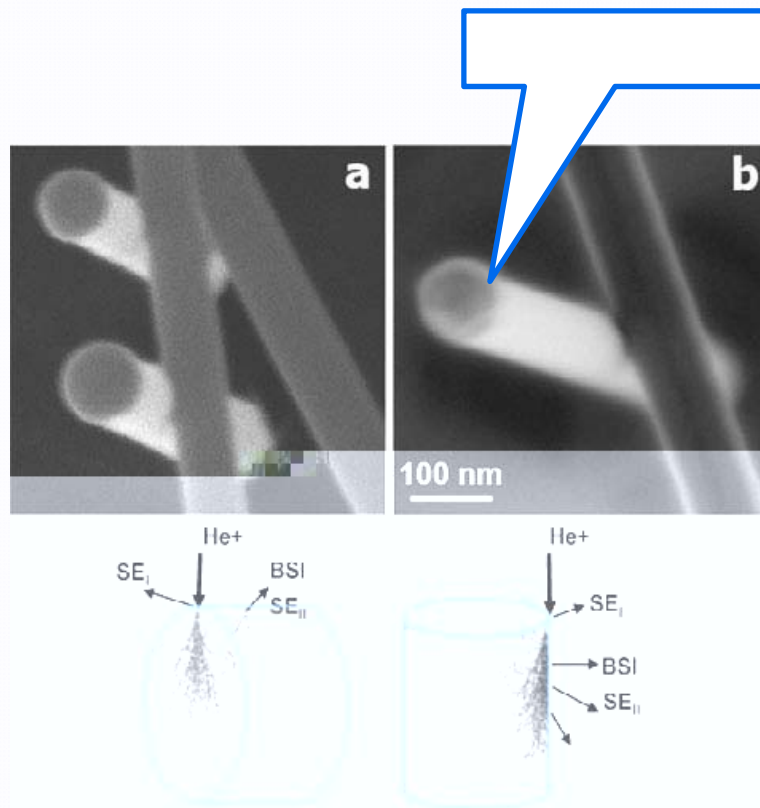
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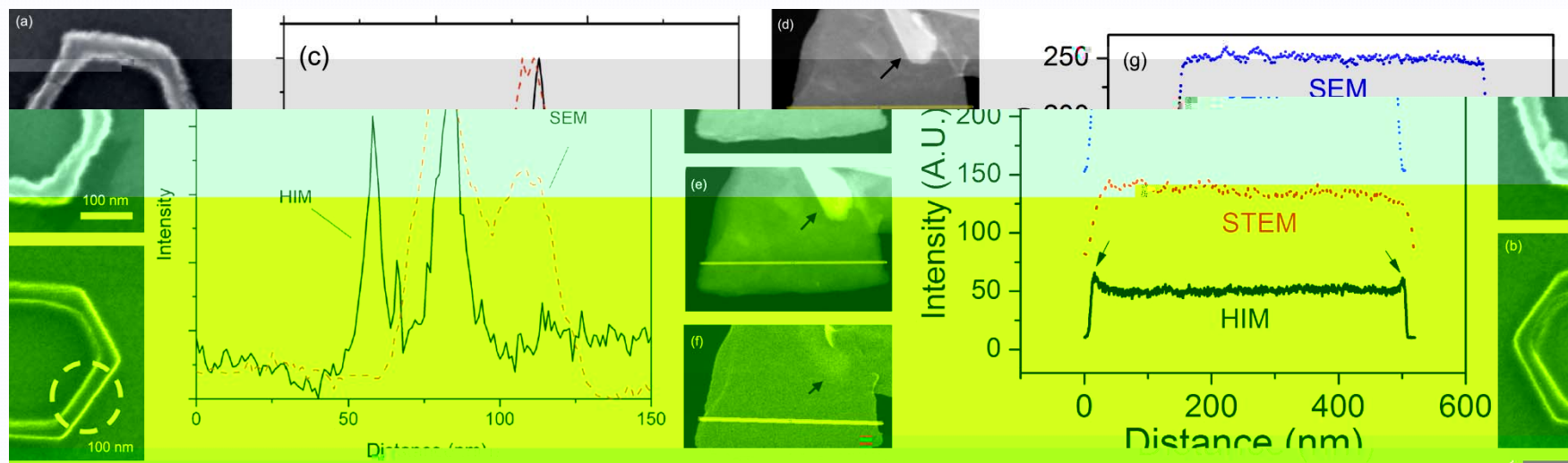
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Interaction and information volume

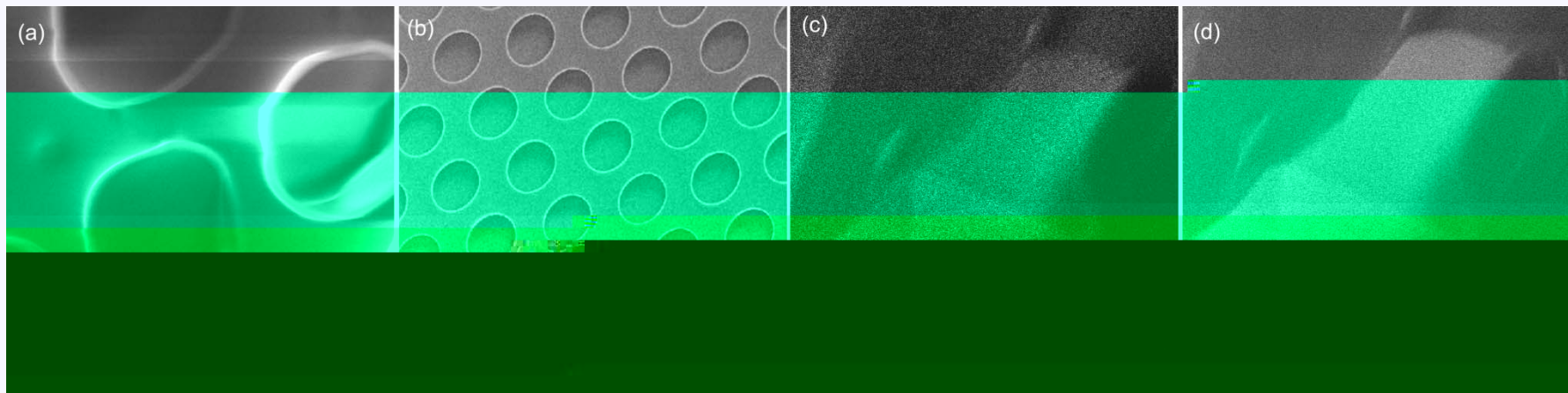


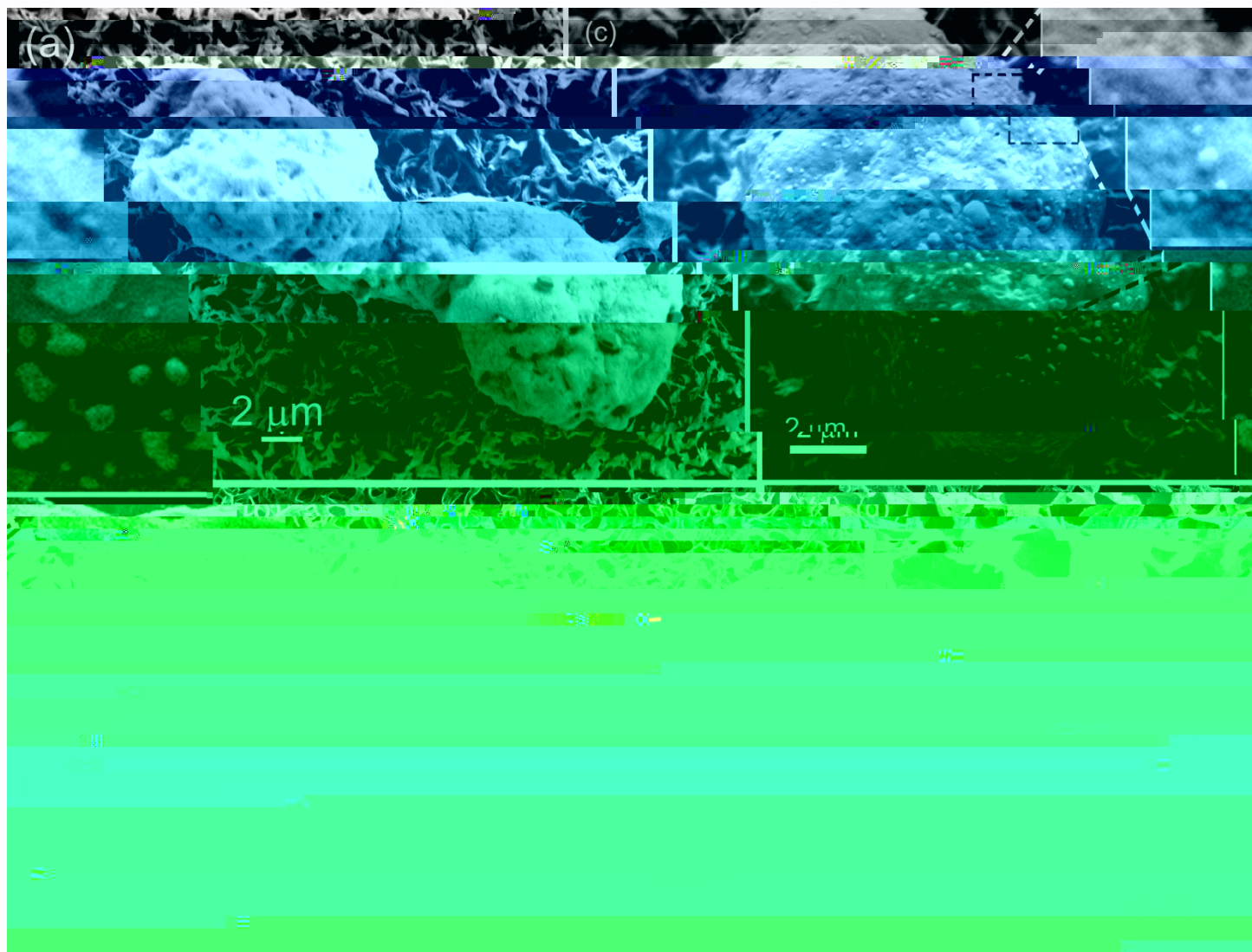
2nd iSE imaging: topographical contrast





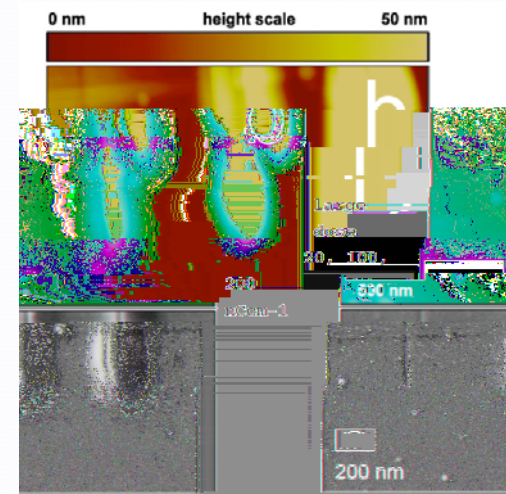
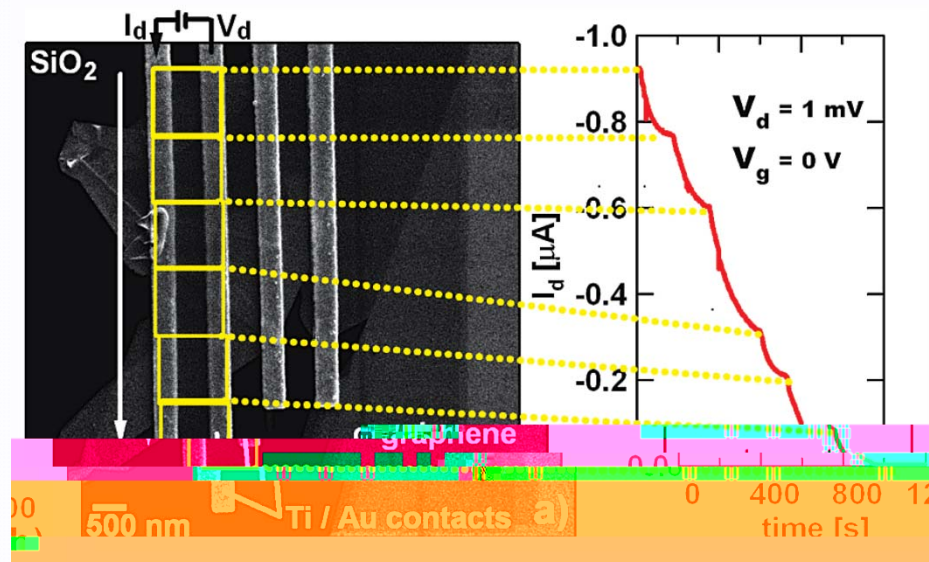
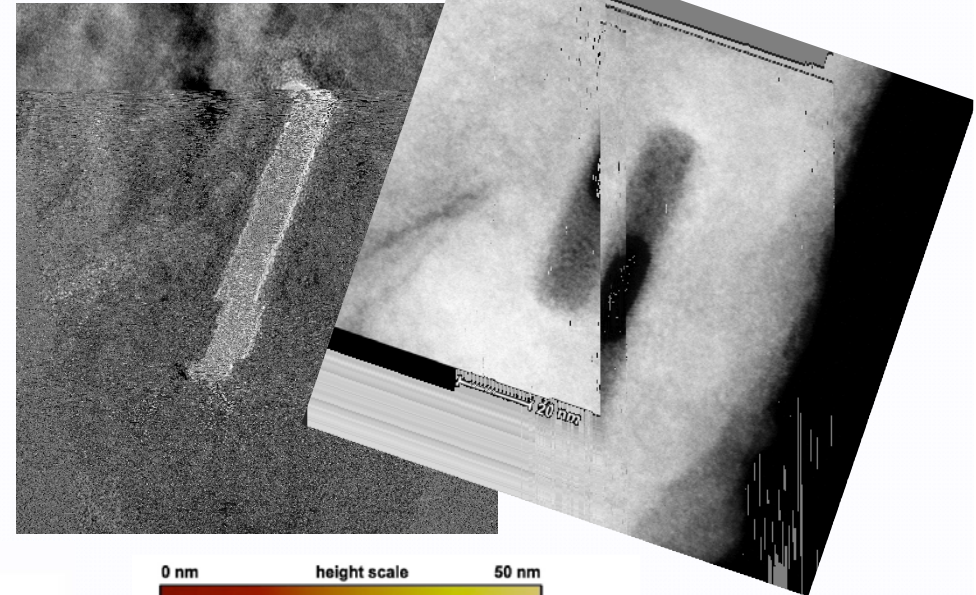
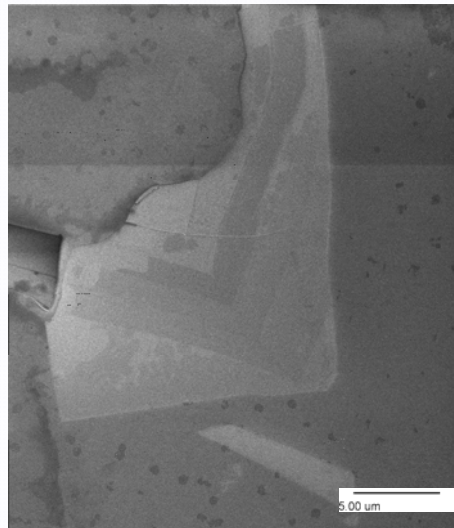
Insulating samples





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Challenges – Contaminations and damage



Beam Deposition and Lithography

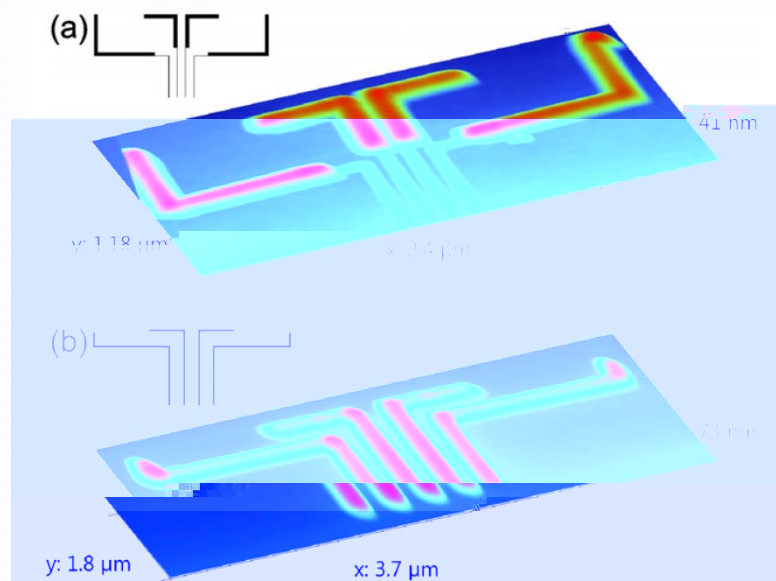
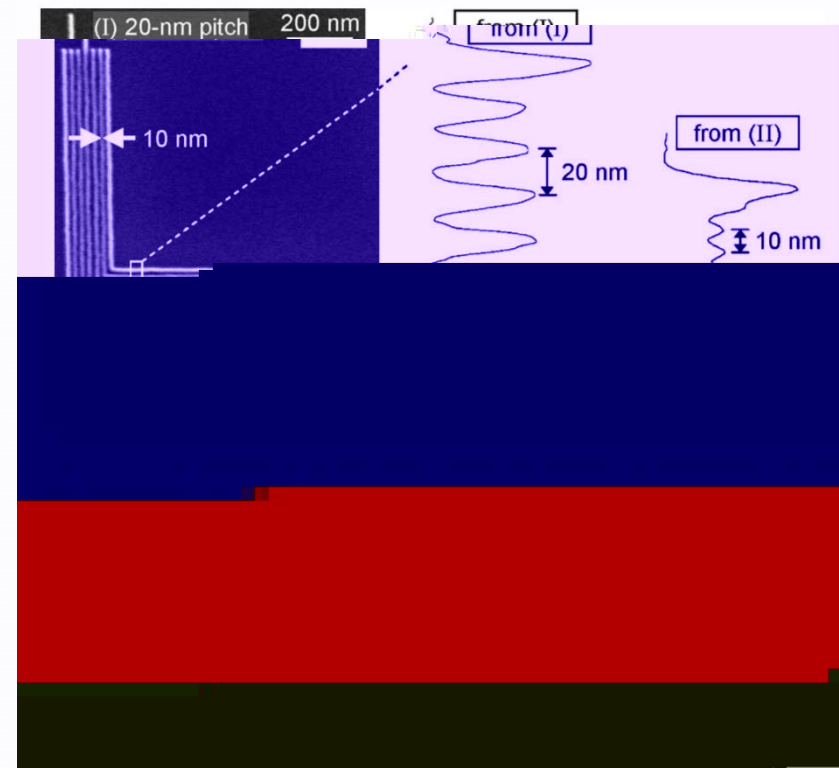


fig. 4. AFM scans of examples of 4 point Hall bar contacts formed by He ion induced deposition of (a) platinum, (b) tungsten. The insets show the bitmap designs used by the pattern generator.

*Focused helium ion
beam milling and deposition.*



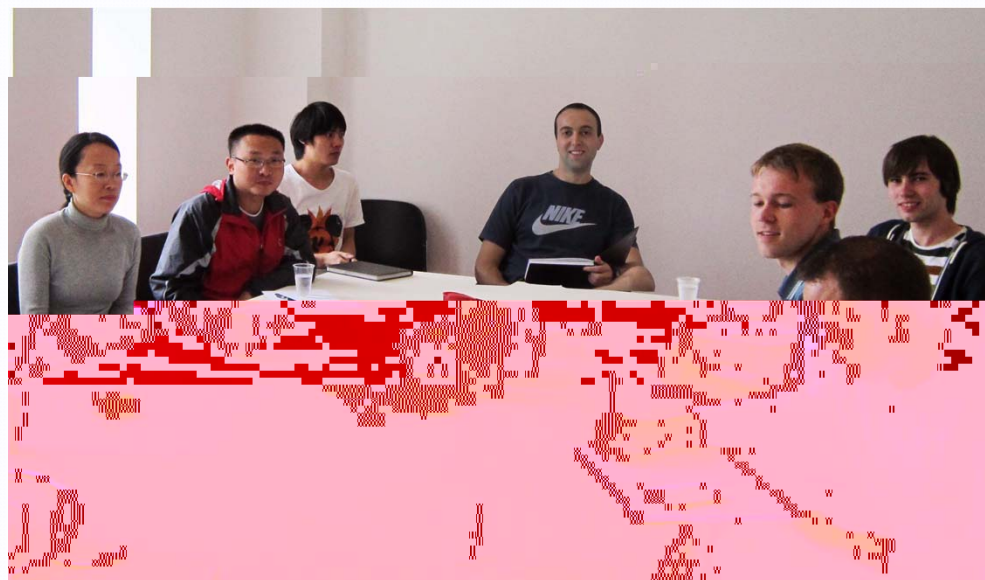
*Scanning helium ion
beam lithography with hydrogen
silsesquioxane resist.*



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Characterization

The Team



Acknowledgement



SOLARPRINT





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