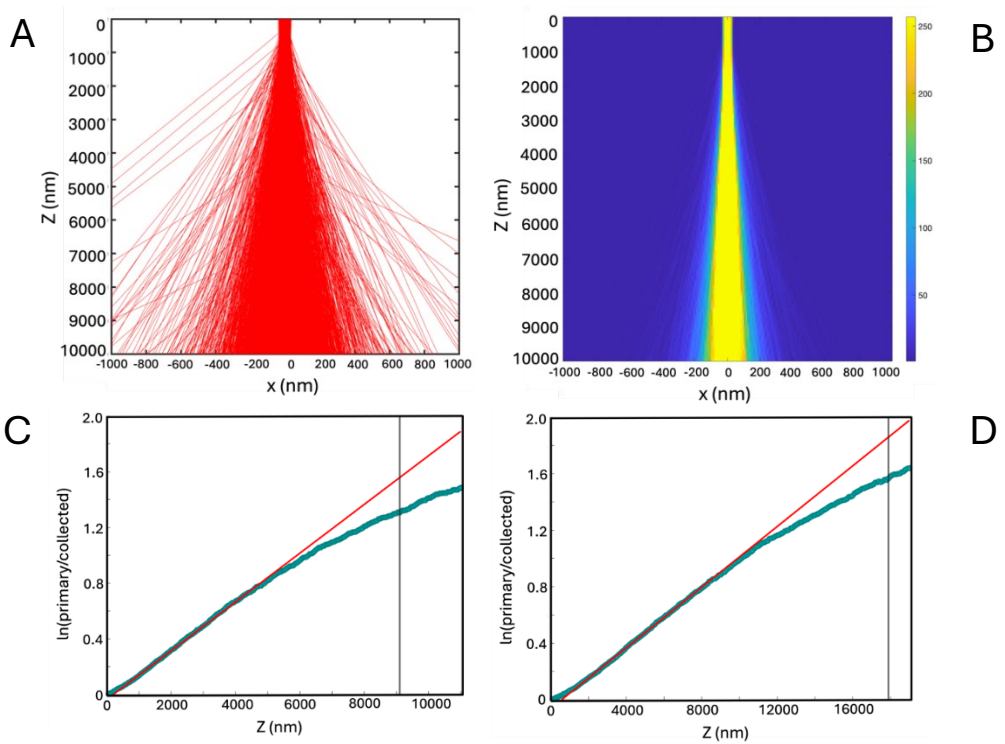
MeV-STEM Shows Promise in Advanced Imaging of Thicker Biological Samples



Electron beam trajectory and intensity profiles at 3 MeV. (**A**) Trajectories of 10,000 electrons in amorphous carbon. (**B**) The heatmap plot reveals beam intensity. (**C**) Relationship between logarithmic ratio of intensities and thickness in amorphous carbon (**D**) and amorphous ice. Vertical lines indicate the maximum linear depth.

Scientific Achievement

Computer simulations demonstrate mega-electron-volt scanning transmission electron microscopy (MeV-STEM) as a promising way to image samples up to 10 micrometers thick.

Significance and Impact

Imaging thicker samples with nanoscale resolution paves the way for new insights into biology and semiconductor research.

Research Details

- The simulation found that high-energy electron beams can penetrate deeper while maintaining fine detail compared to lower-energy beams.
- Elements with higher atomic numbers and high density were shown to scatter electrons more strongly
- Focusing the electron beam deeper within the sample, rather than at the top surface, resulted in a narrower, more precise beam profile

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