Contribution ID: **205** Contribution code: **FRAN02** Type: **Contributed Oral Presentation**

High-Precision Characterization of MeV Electron Interactions for Advanced Nano-Imaging of Thick Biological Samples and Microchips

Friday 15 August 2025 09:50 (20 minutes)

The resolution of a MeV Scanning Transmission Electron Microscope (MeV-STEM) is mainly limited by the electron beam properties and angular broadening in thick biological samples and microchips. Addressing these challenges requires understanding beam emittance, optical aberrations, and energy-dependent scattering angles. We propose a standardized method to assess beam intensity, divergence, and size at the sample exit to better characterize electron-sample interactions, align analytical models, and validate Monte Carlo simulations. Our results show that accurately measuring parameters—especially angular broadening—is both feasible and essential for improving resolution. Using a high-energy (1–10 MeV) electron source and tailored beams, along with amorphous ice and silicon as sample proxies, we aim to optimize beam energy and focus for enhanced imaging. This is critical for in-situ imaging of thick biological samples and detecting nanometer-scale microchip defects. Ultimately, we aim to map the minimum electron energy needed for nanoscale resolution across varying sample types and imaging modes.

Please consider my poster for contributed oral presentation

Yes

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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