

MM 29: Invited Talk: Philipp Pelz

Time: Thursday 9:30–10:00

Location: SCH/A251

Invited Talk

MM 29.1 Thu 9:30 SCH/A251

Three dimensional sub-Ångström resolution imaging from 4D-STEM experiments — ●PHILIPP PELZ — Friedrich Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany

Electron ptychography is rapidly emerging as a way to turn scattered high-energy electron waves into precise three-dimensional atomic maps, effectively solving a challenging inverse problem that links measurement, modeling, and reconstruction. By combining multi-slice physics, joint optimization, and automated data collection, we can

now recover sub-Ångström 3D structures even when the experiment violates classical limits in electron microscopy such as depth of focus and tomographic completeness. These methods dramatically expand the range of materials and volumes that can be imaged at true atomic resolution, opening the door to data that is richer, more robust, and more compatible with theory and simulation. I will present several results that bridge experiment and computational modeling through a unified, physics-based reconstruction framework, show applications to nanomaterials and outline our ambitions to scale the method to larger volumes.