

Advanced Microscopy Facility

University of Victoria

The following is a condensed summary of the technical capabilities of the STEHM, suitable as background information for members of the press looking to write articles about our instrument and laboratory.

Scanning Transmission Electron Holography Microscope (STEHM)

The Scanning Transmission Electron Holography Microscope (STEHM) is a one of a kind ultra-high resolution electron microscope. It will be used by researchers of many science and engineering disciplines for projects requiring knowledge of nanoscience and nanotechnology. It is capable of resolution better than 36 picometers (about 1/10th the size of an atom). The STEHM will enable researchers to see the atoms, determine the number and types of atoms imaged and manipulate the atoms and their electrons in a manner never before possible.

The STEHM has many special features that are unique. The first is its electron source, which is the most coherent and brightest of any electron microscope in the world. As well, the STEHM has two modes of imaging (TEM and STEM). The TEM mode has the first spherical and coma aberration corrector, which produces a high-resolution image over a wide field of view. The STEM mode has the first spherical and chromatic aberration corrector that corrects for the two largest aberrations. The STEHM is the first electron microscope to have four electron biprisms to improve current methods of electron holography and allow investigations into the yet unseen world of quasiparticles important for understanding nanoscience and developing nanotechnology. The STEHM will be one of the first electron microscopes with dislocated hologram apertures (fabricated in our laboratory) for creating electron vortex beams with optical angular momentum enabling manipulation of the specimen by the electron beam. The STEHM has full analytical capabilities that can determine the types and number of elements present and high resolution cameras for collecting data and rendering it useful for analysis.

In short, the STEHM is a powerful research tool for Canadians and the world.