A typical diffraction experiment is limited to measuring a limited portion of reciprocal space, yielding a limited amount of information about the sample; allowed diffraction peaks originating from atomic spacings in a specific direction in reciprocal space. In recent years, with advances in 1-D mapping technologies, rapid reciprocal space mapping techniques have become essential in understanding materials that do not lie on a collinear projection in reciprocal space. This has led to the important conclusion that the overall sample morphology, not just the reduced, folded unit cell properties, are important in unlocking the potential of materials. With research focusing on materials with ever decreasing symmetry (Cubic to Tetragonal to Orthorhombic), accessing the largest portion of reciprocal space possible is paramount to understanding the nuances of structure-property relationships.

The use of symmetrically divergent sources and 2 dimensional detectors will be presented for rapid measurements of an unprecedented amount of reciprocal space on a multitude of materials, ranging from powders to epitaxial thin films. In addition, a comparison with conventional reciprocal space mapping techniques will be given.