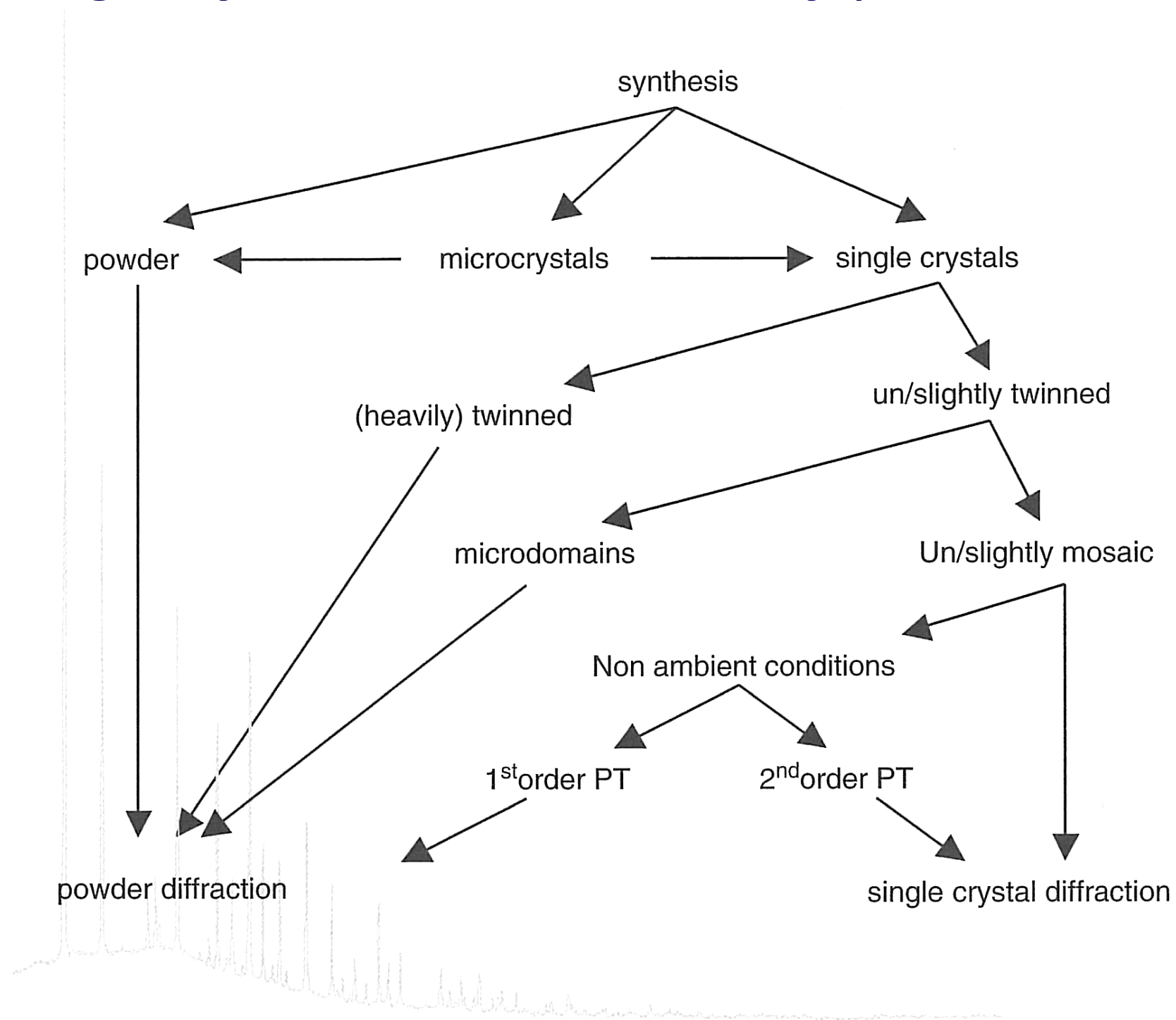
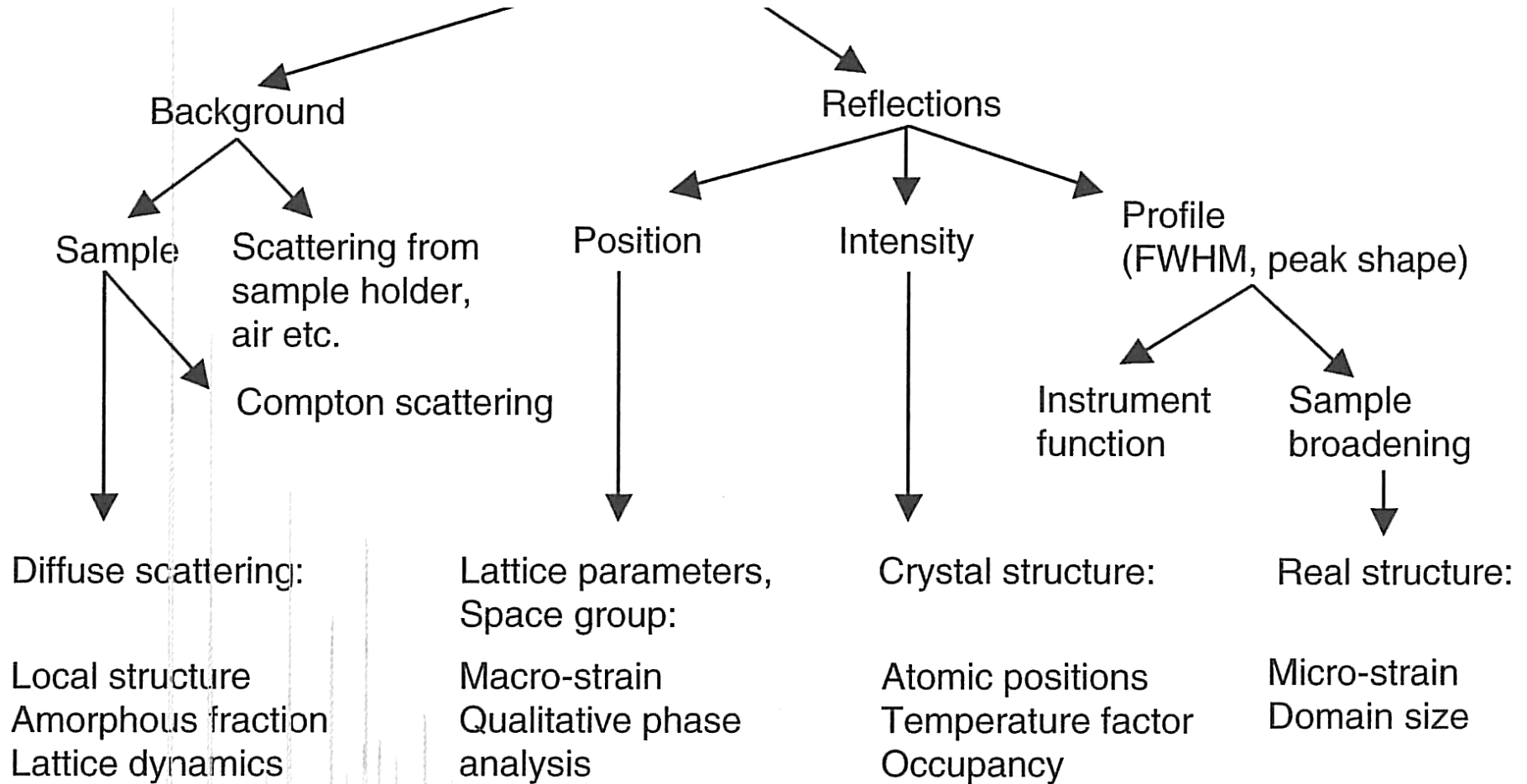


Single crystal diffraction with x-ray (and neutrons)

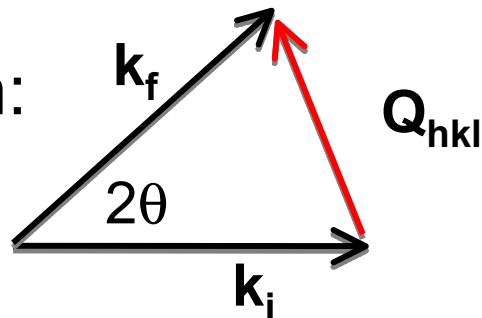


X-ray hitting condensed matter



Bragg equation:

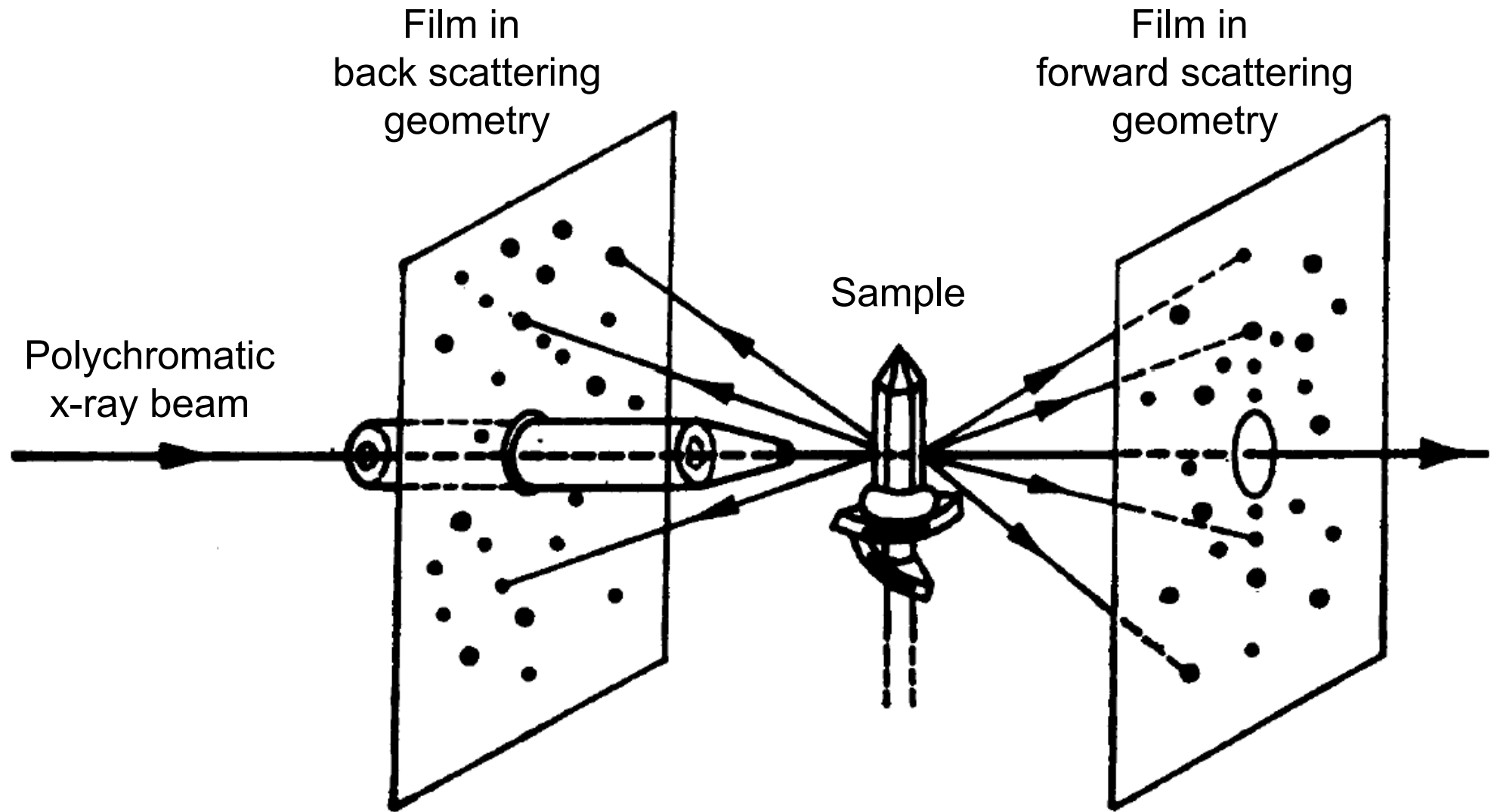
$$\lambda = 2d_{hkl} \sin\theta$$



Laue equation: $\mathbf{Q}_{hkl} = \mathbf{k}_f - \mathbf{k}_i$

$$F(\mathbf{h}) = \sum_{j=1}^n g^j t^j(s) f^j(s) \exp(2\pi i \mathbf{h} \cdot \mathbf{x}^j)$$

Laue pattern for crystal orientation and symmetry



Laue pattern for crystal orientation and symmetry

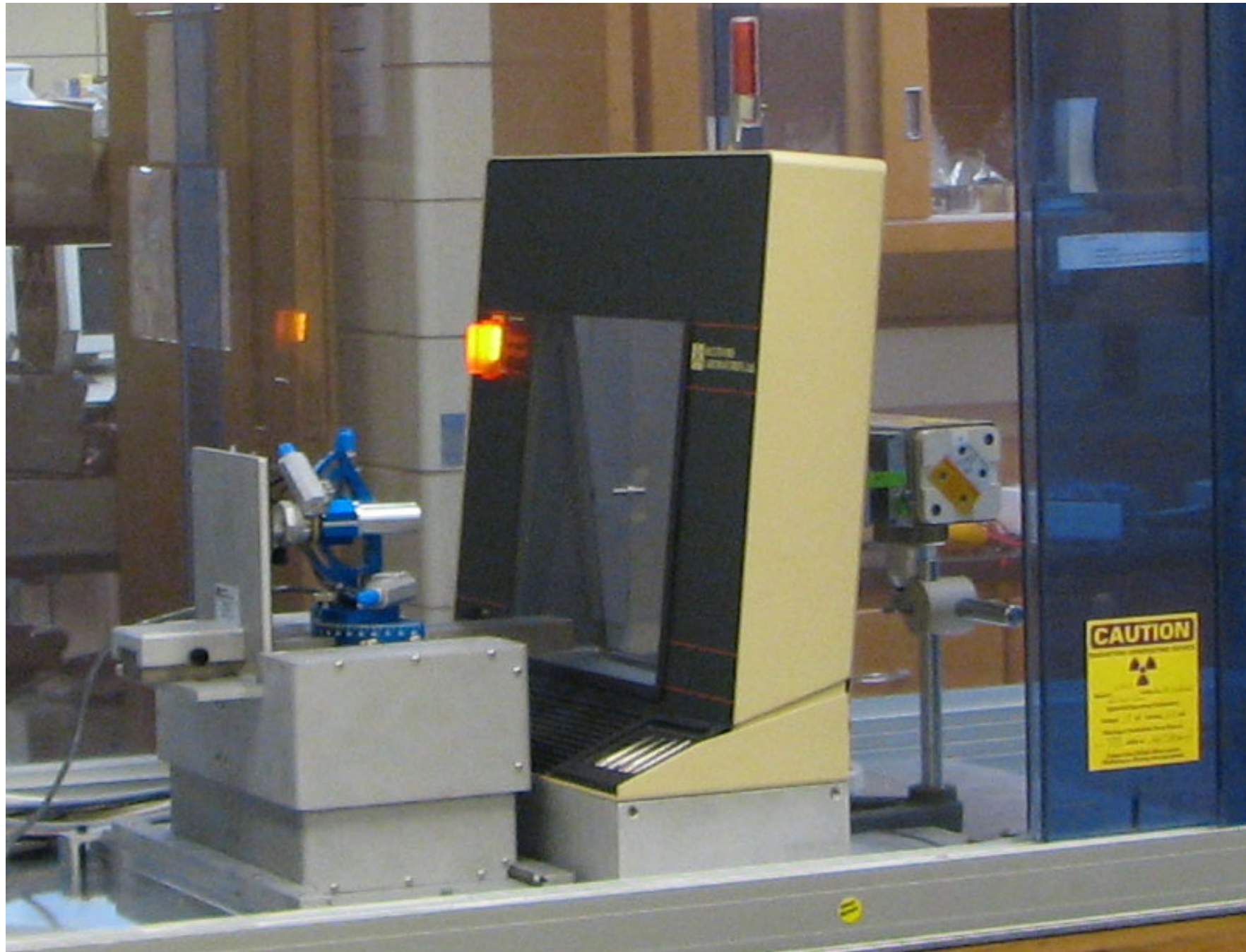
Film in
back scattering
geometry



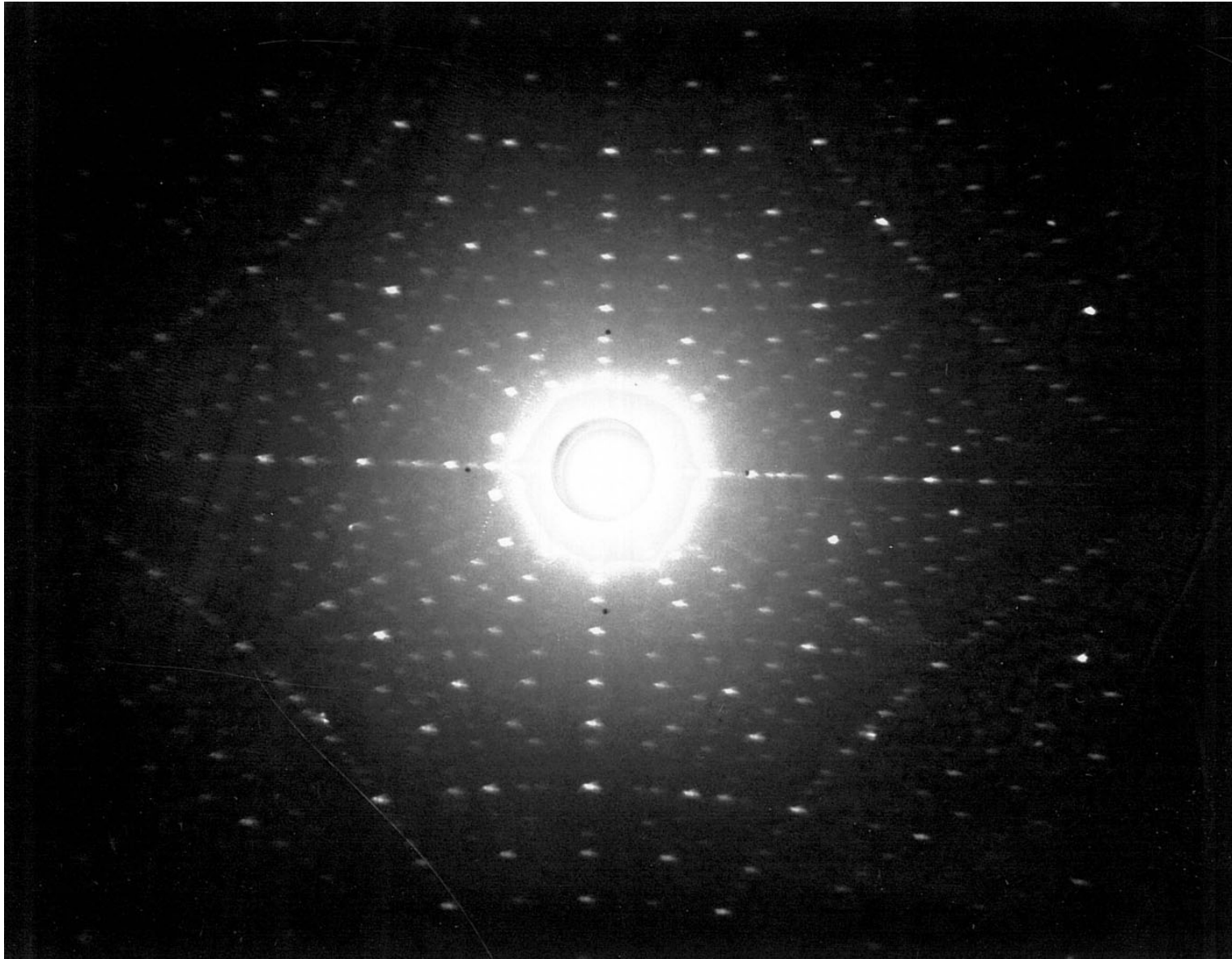
Film in
forward scattering
geometry



Laue pattern for crystal orientation and symmetry

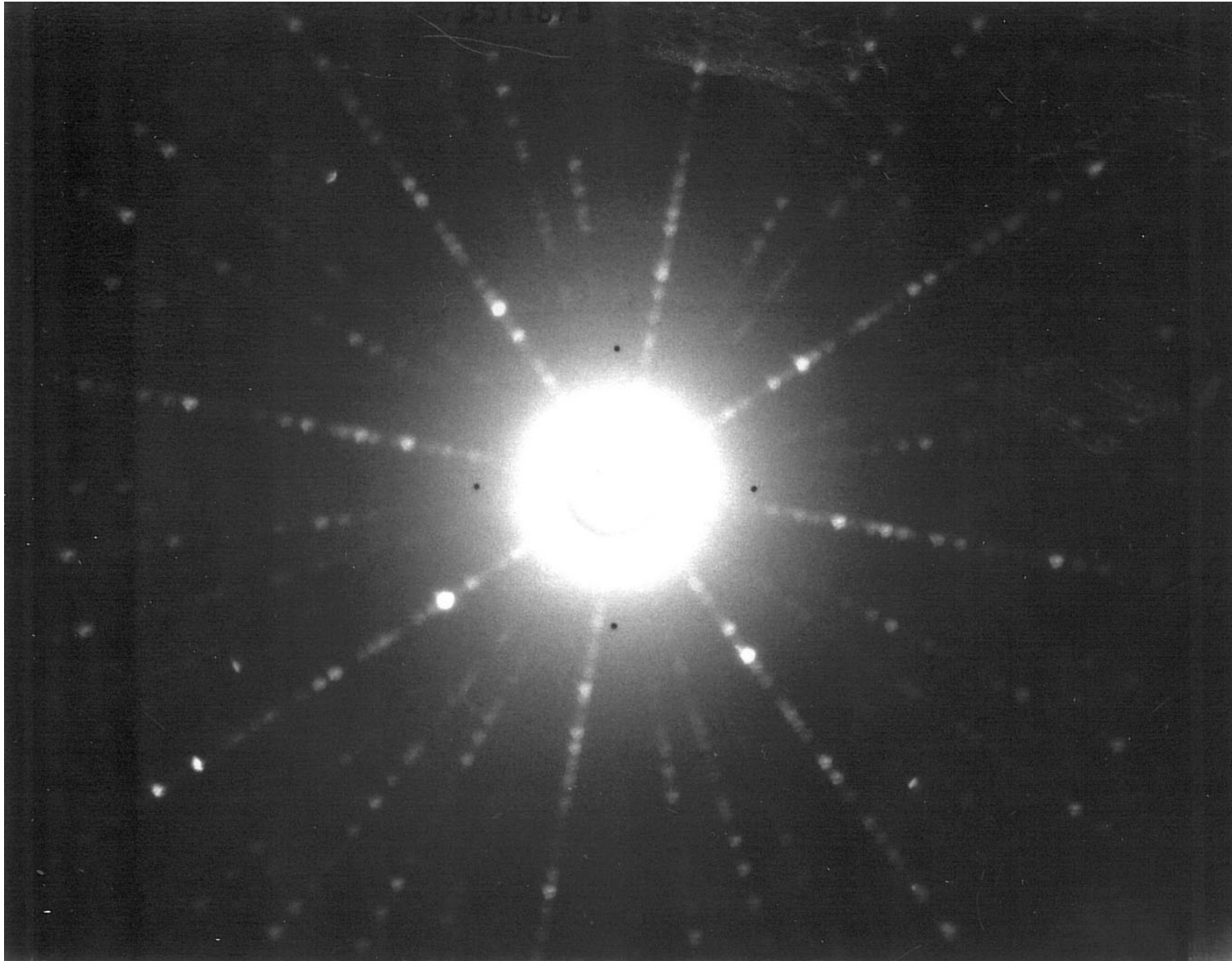


Laue pattern for crystal orientation and symmetry



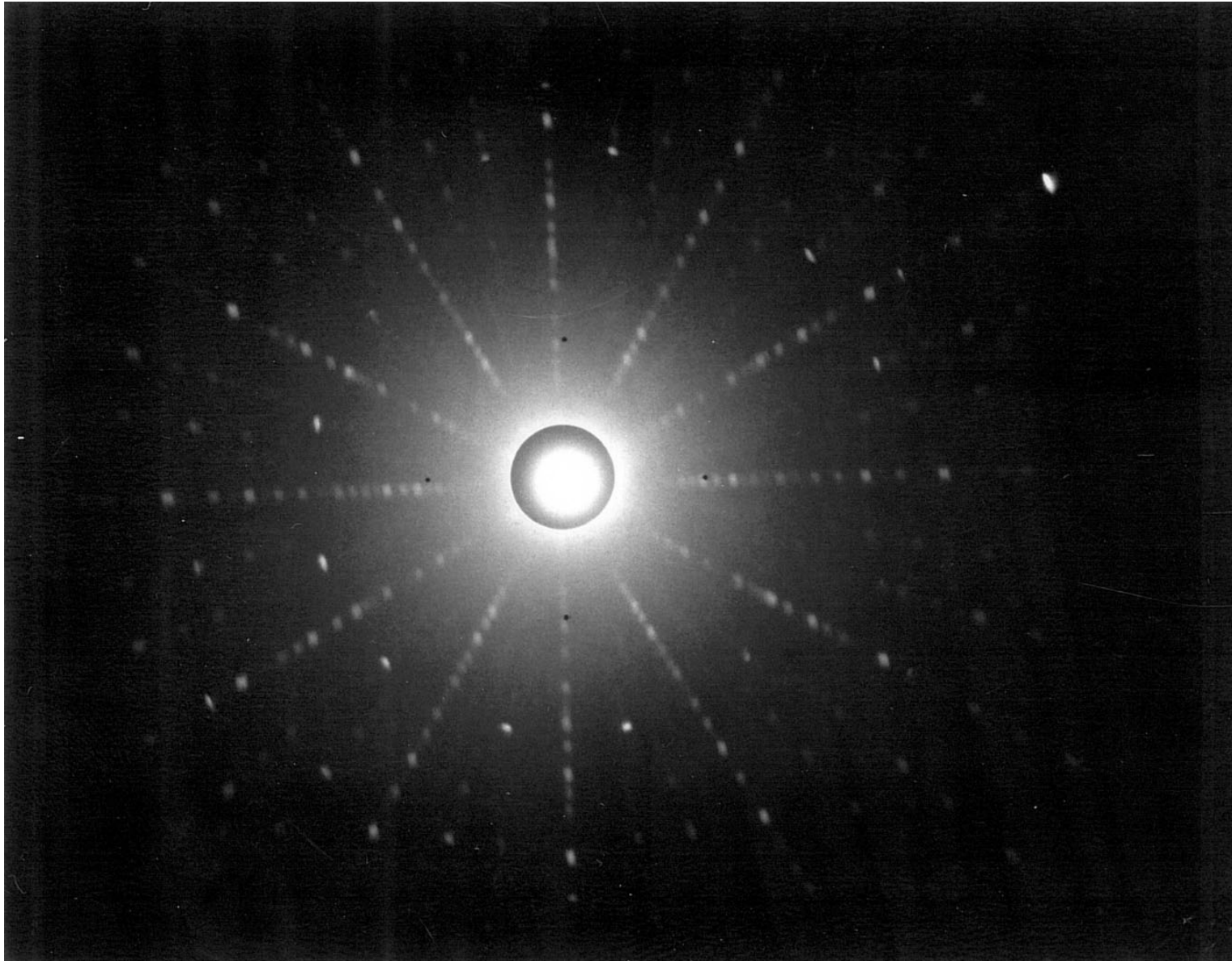
twofold rotation axis + 2 mirror planes

Laue pattern for crystal orientation and symmetry



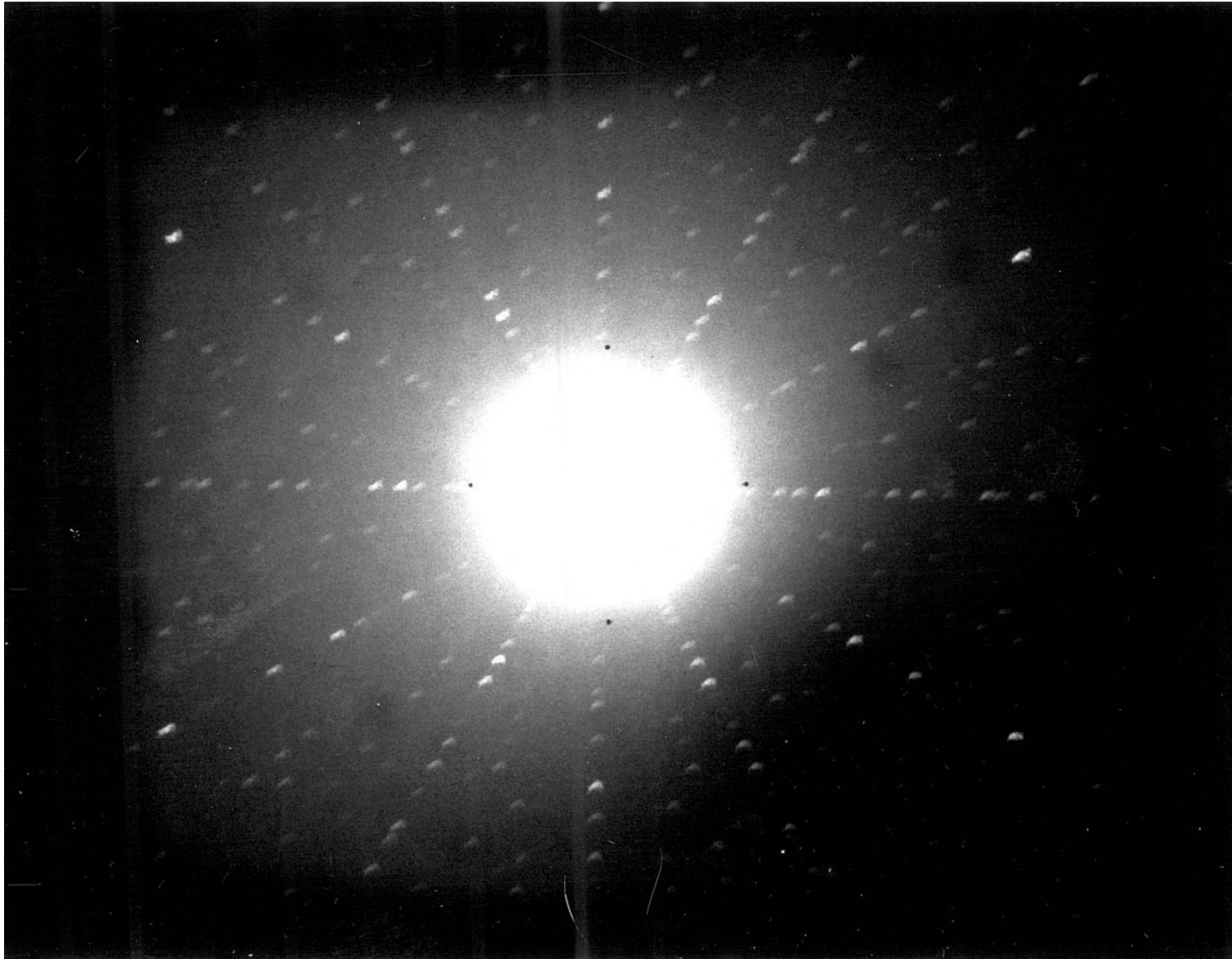
fourfold rotation axis + 4 mirror planes

Laue pattern for crystal orientation and symmetry



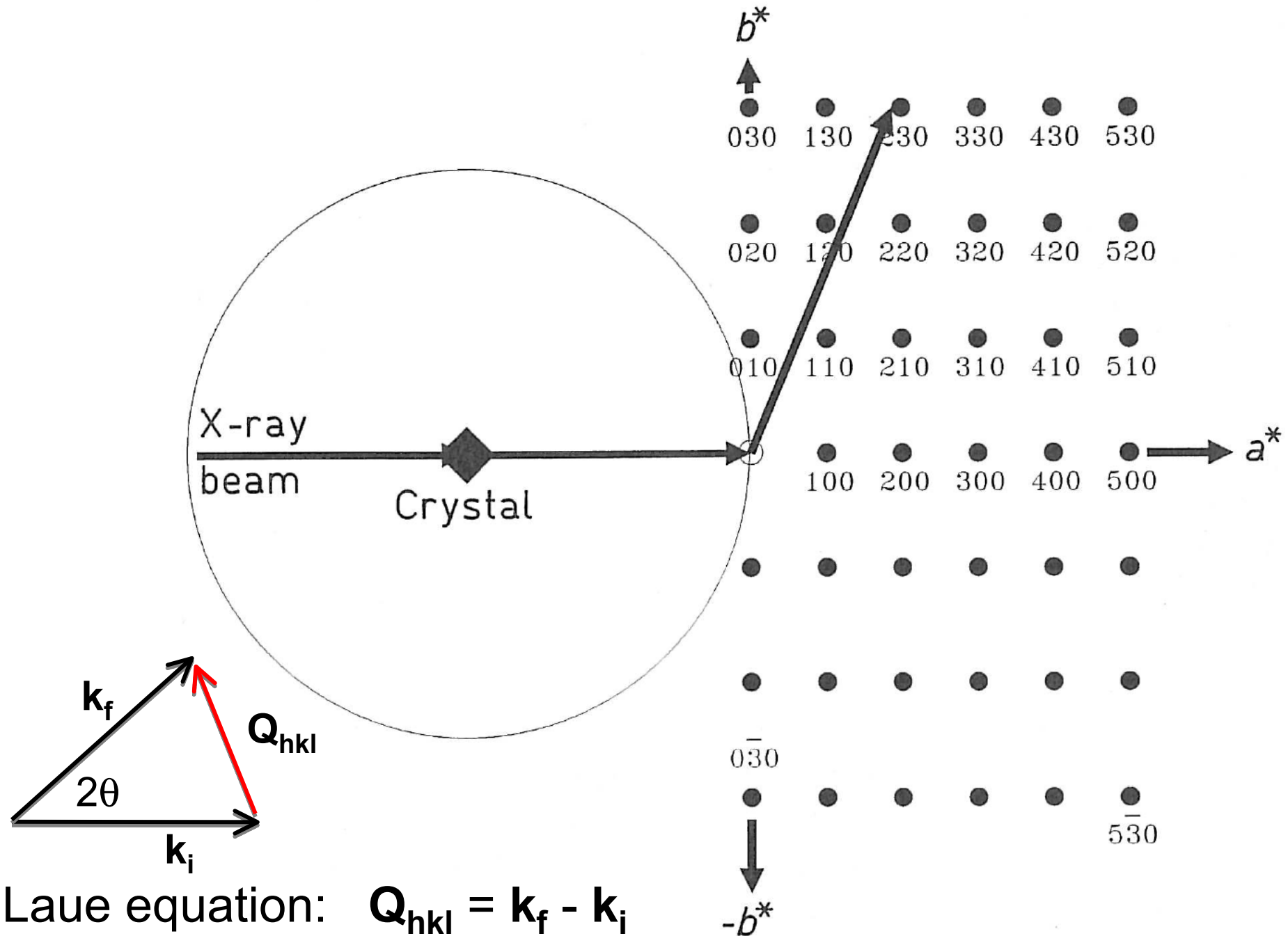
sixfold rotation axis + 6 mirror planes

Laue pattern for crystal orientation and symmetry

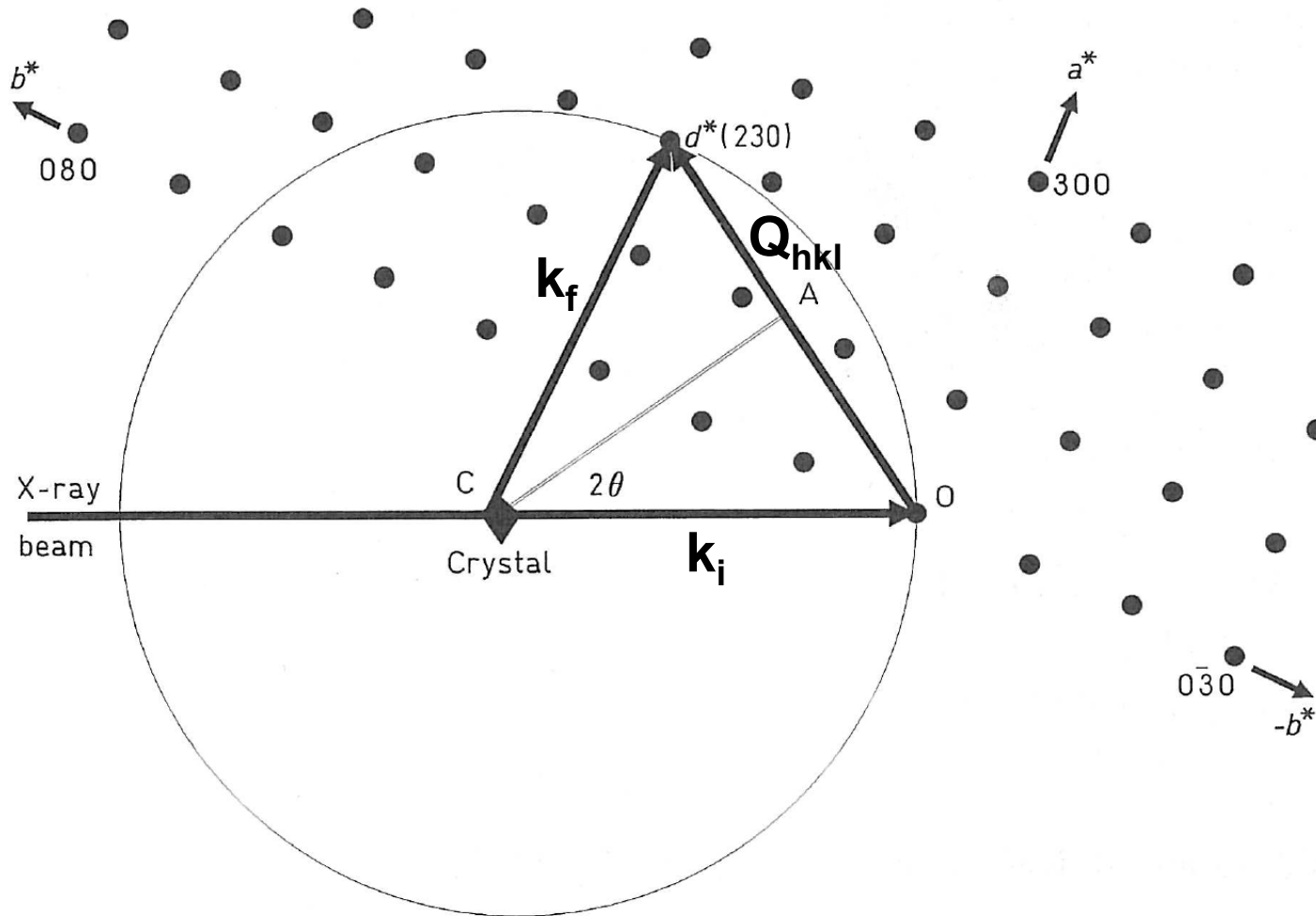


Your home work...

Single crystal diffractometer (four circle geometry)

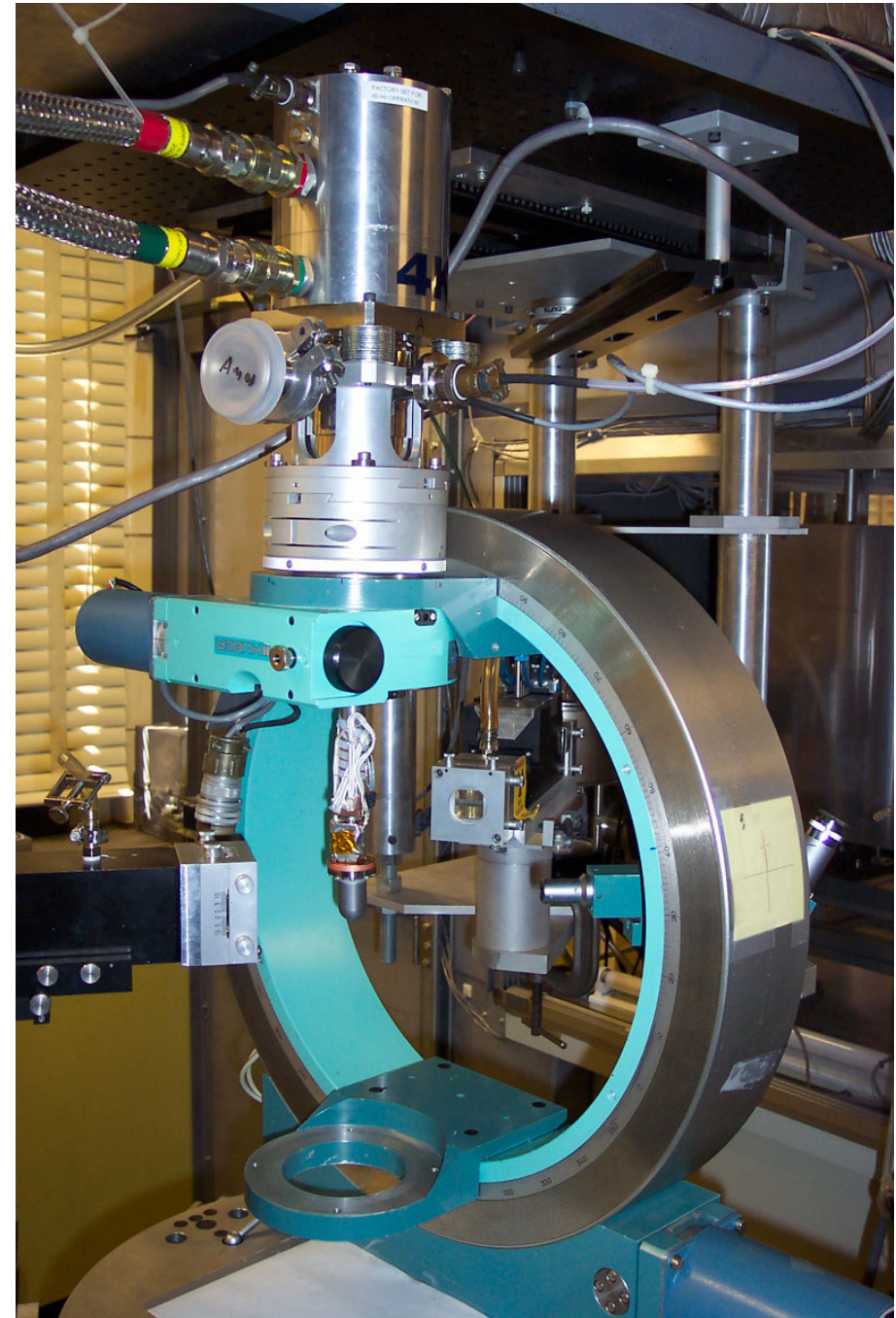
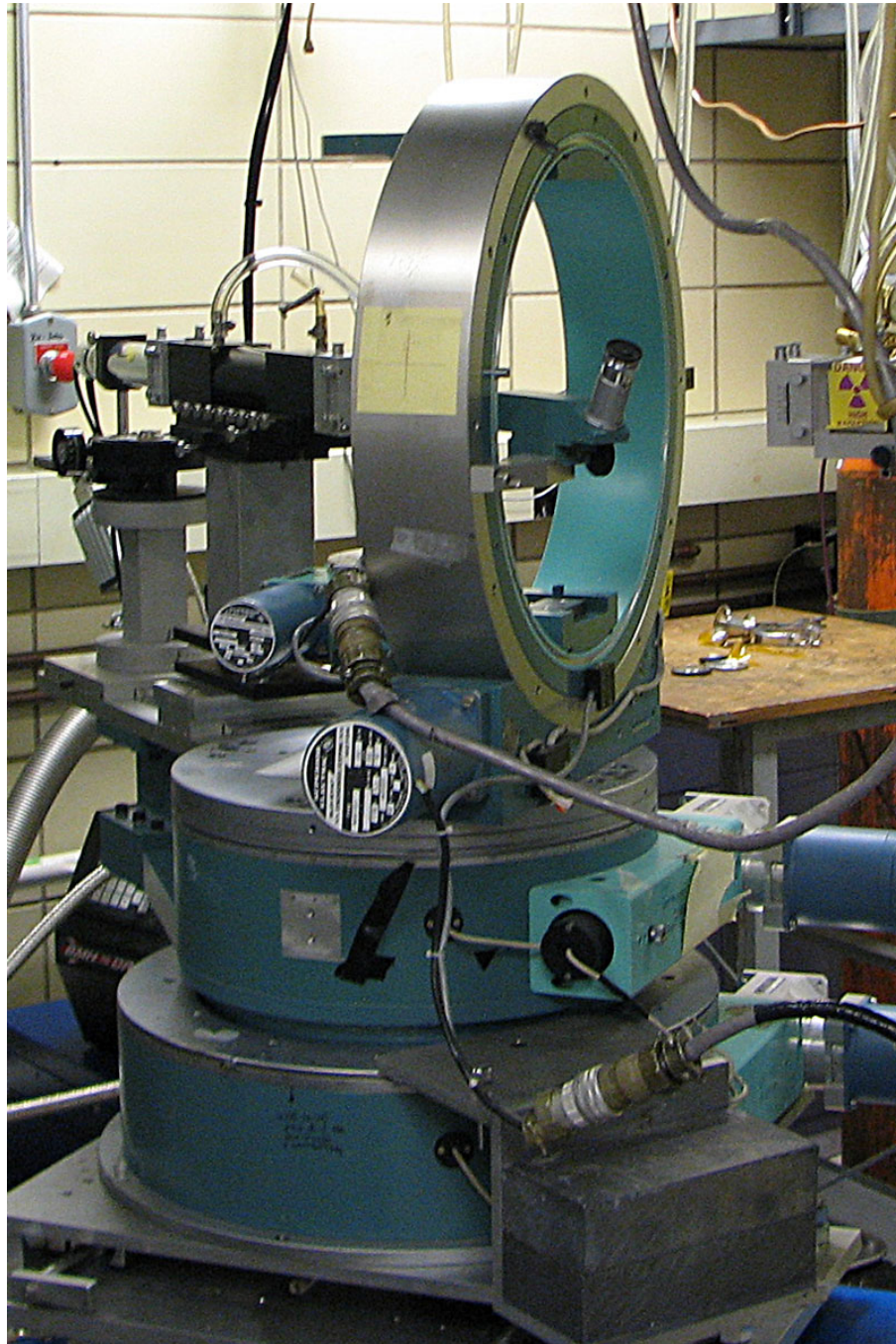


Single crystal diffractometer (four circle geometry)

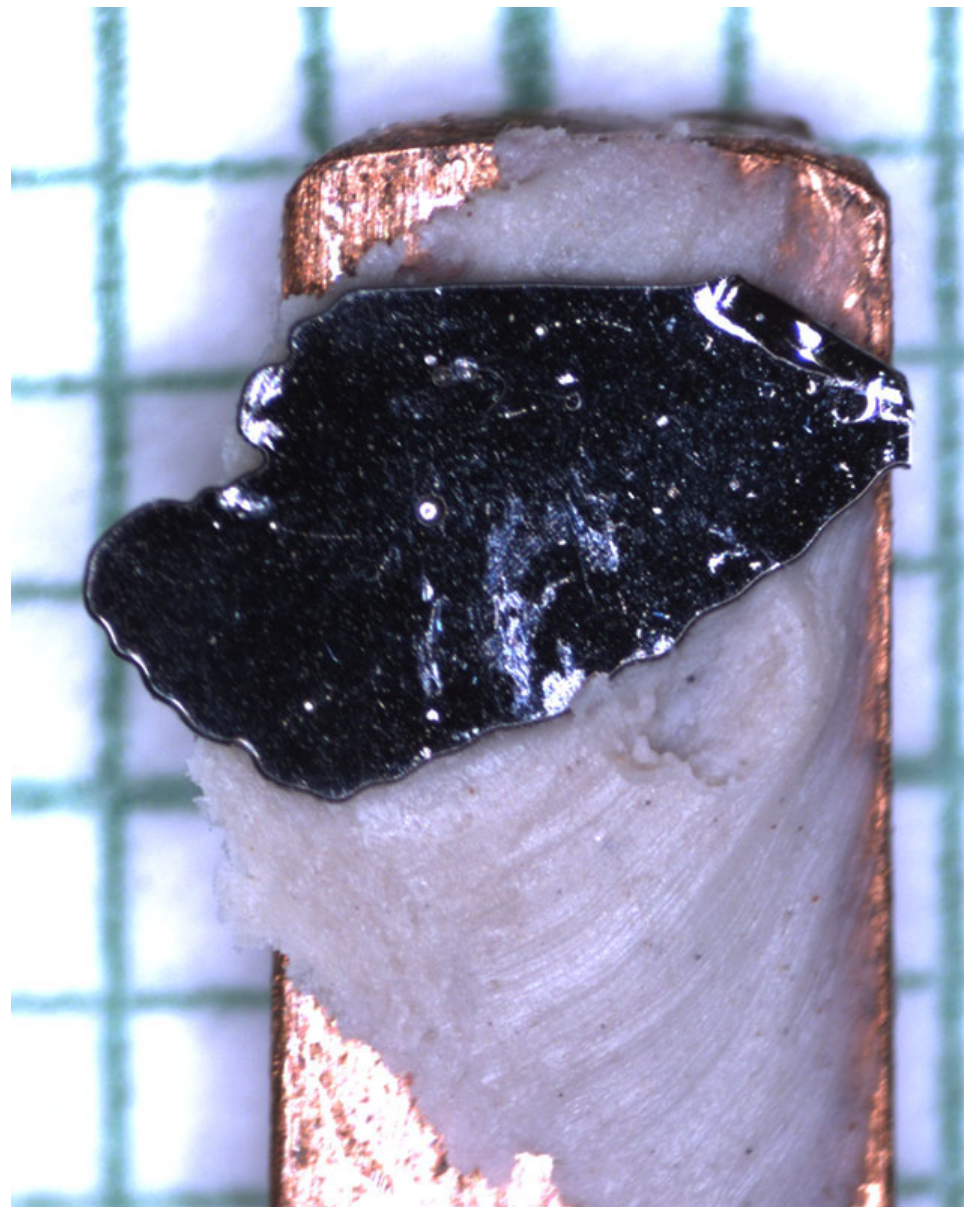
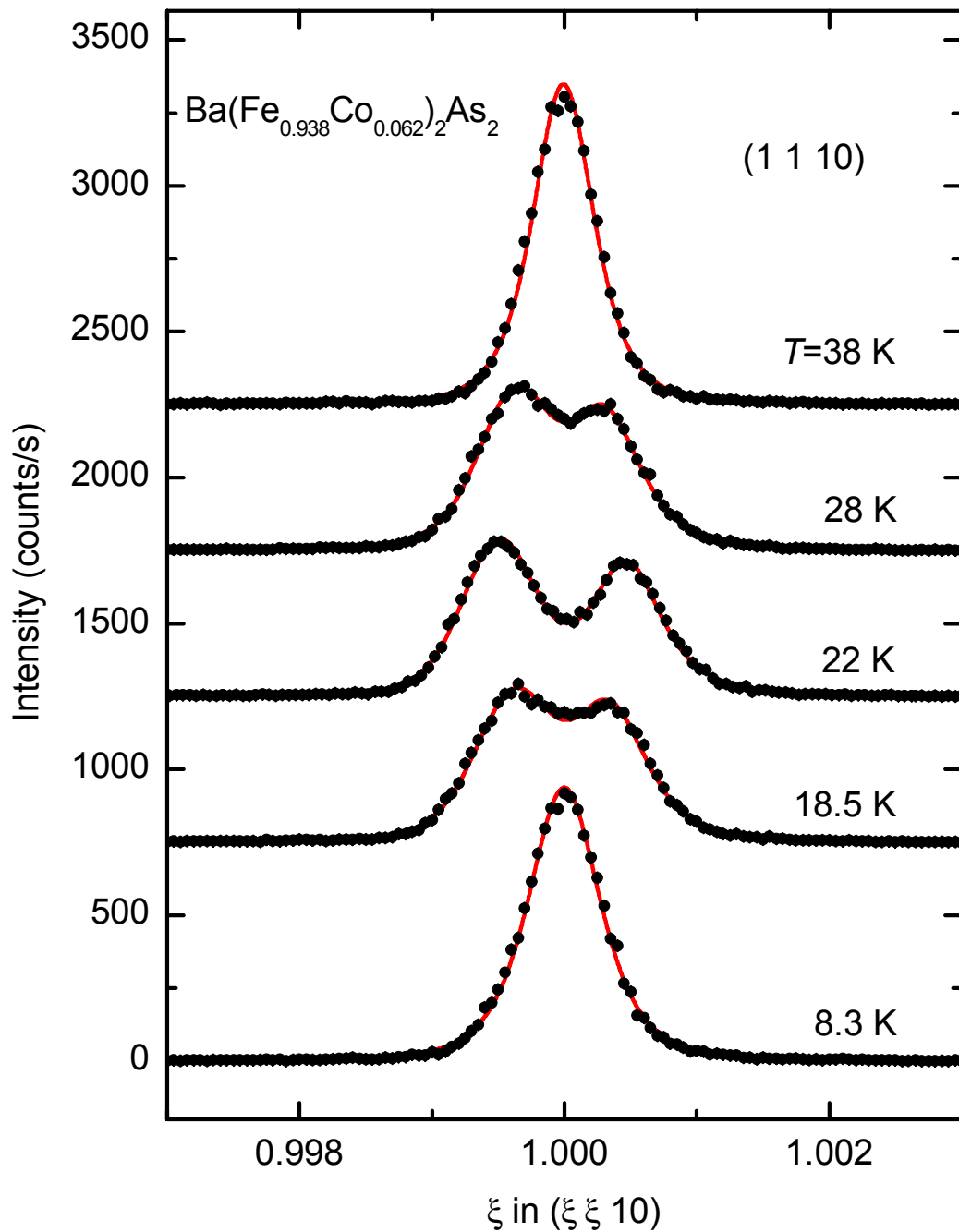


Laue equation: $Q_{hkl} = k_f - k_i$

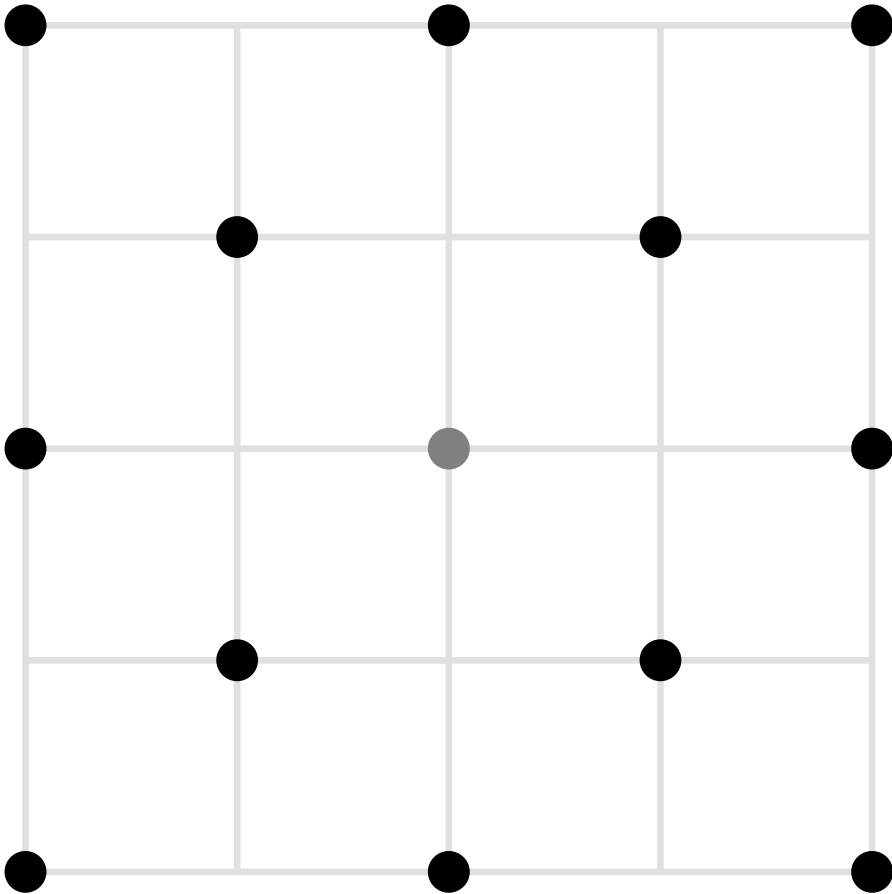
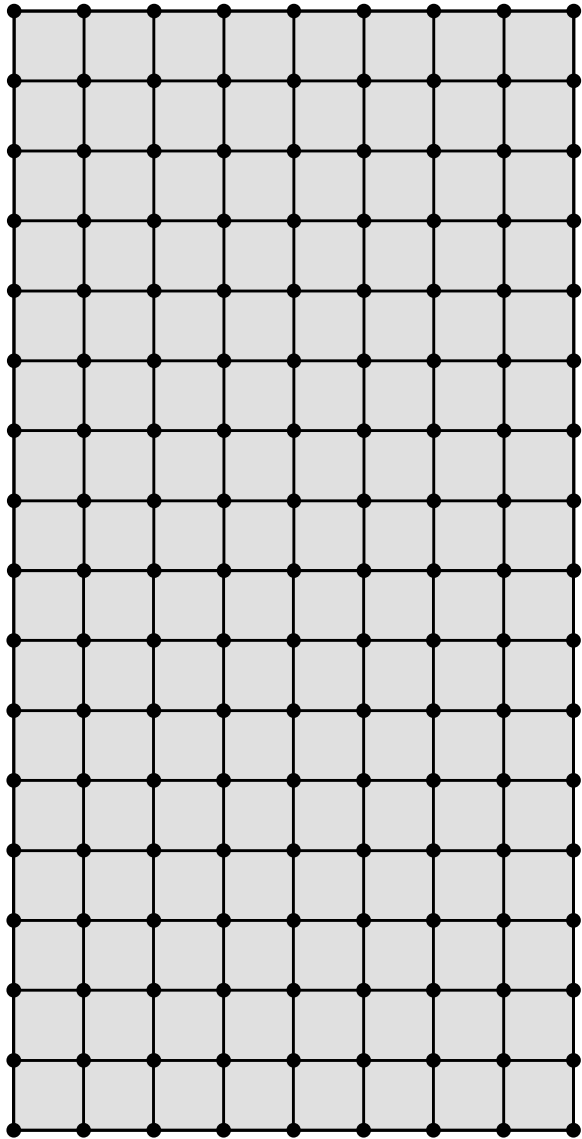
Single crystal diffractometer (four circle geometry)



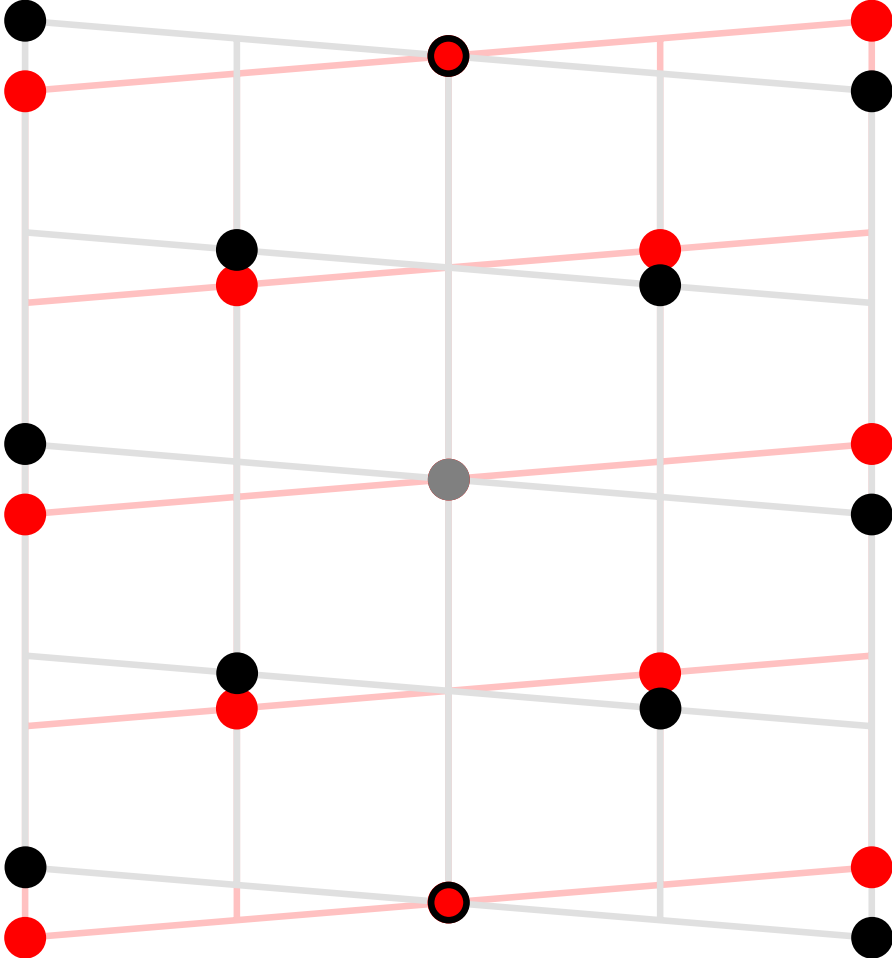
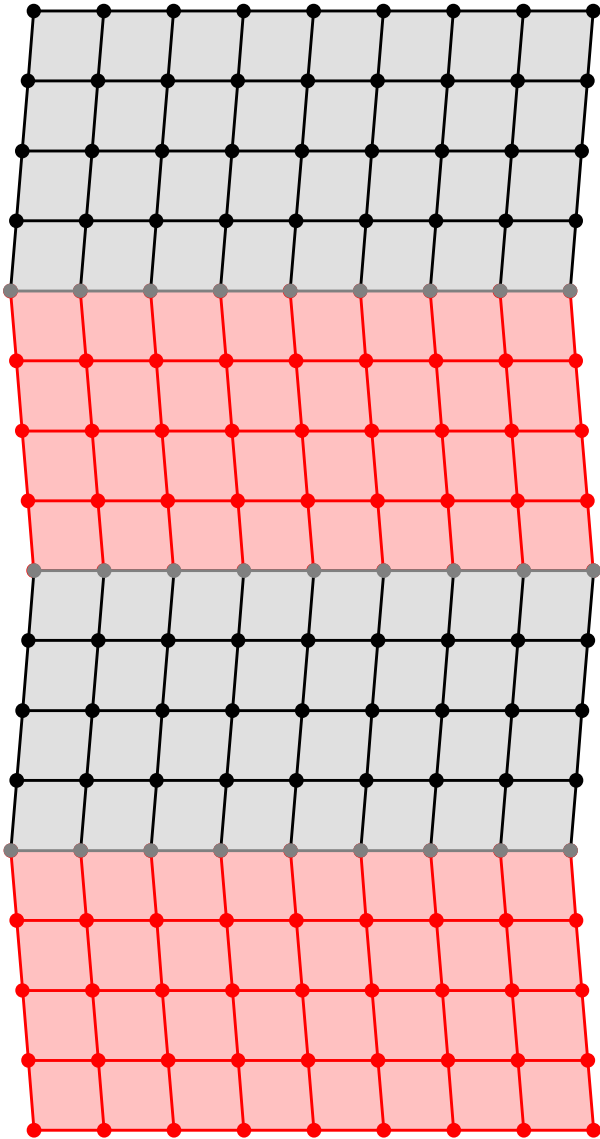
Single crystal diffractometer (four circle geometry)



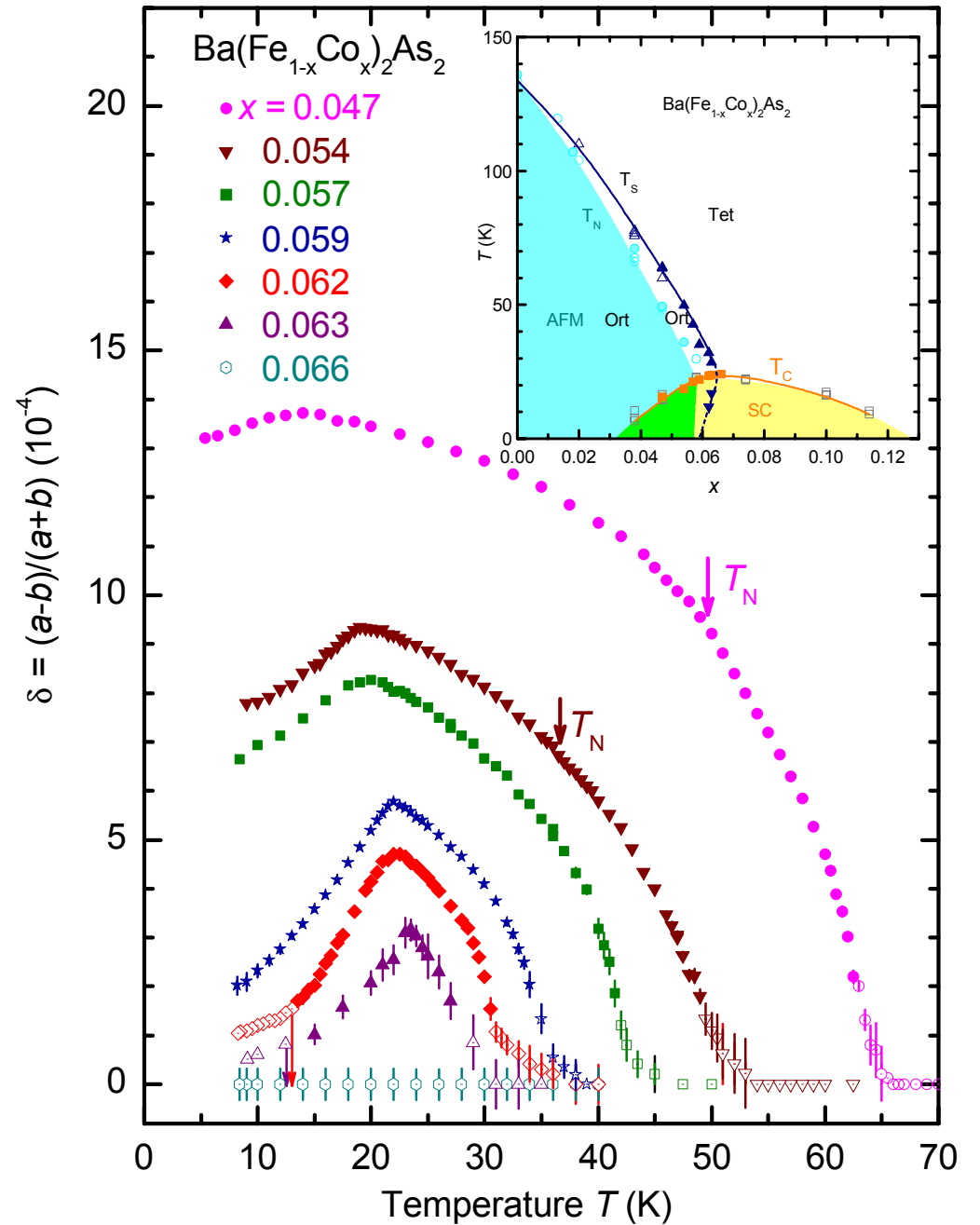
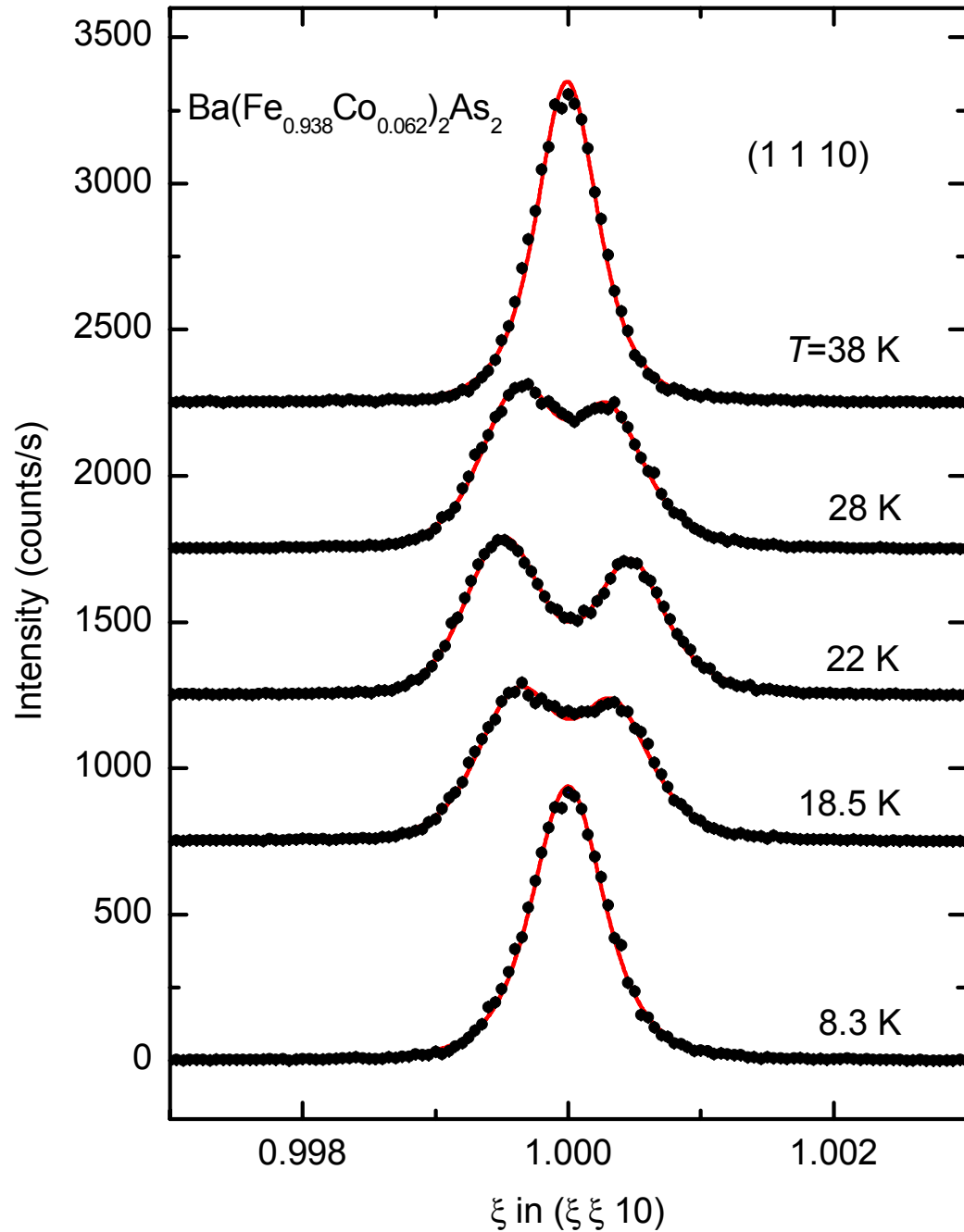
Tetragonal-orthorhombic distortion studied by diffraction



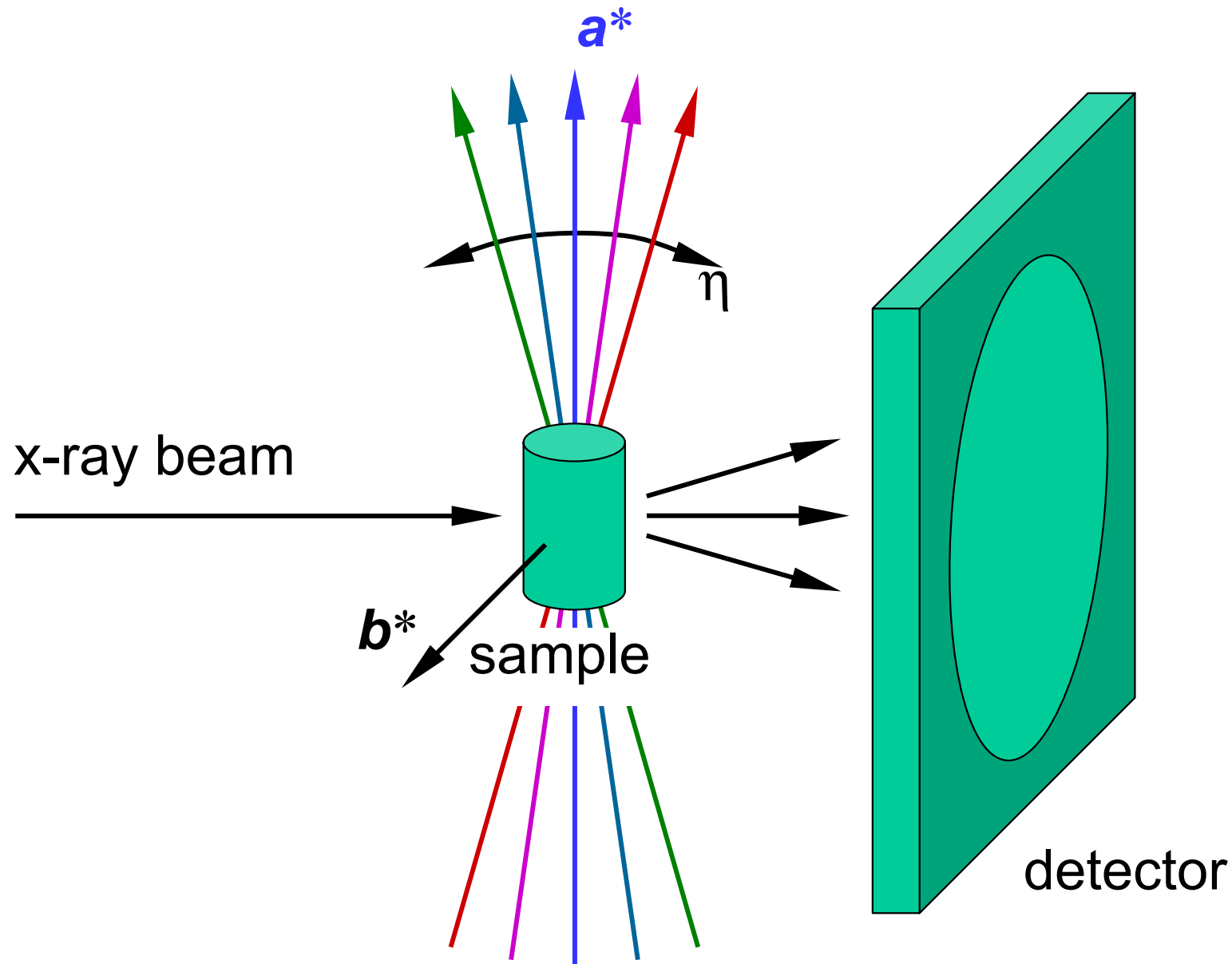
Tetragonal-orthorhombic distortion studied by diffraction



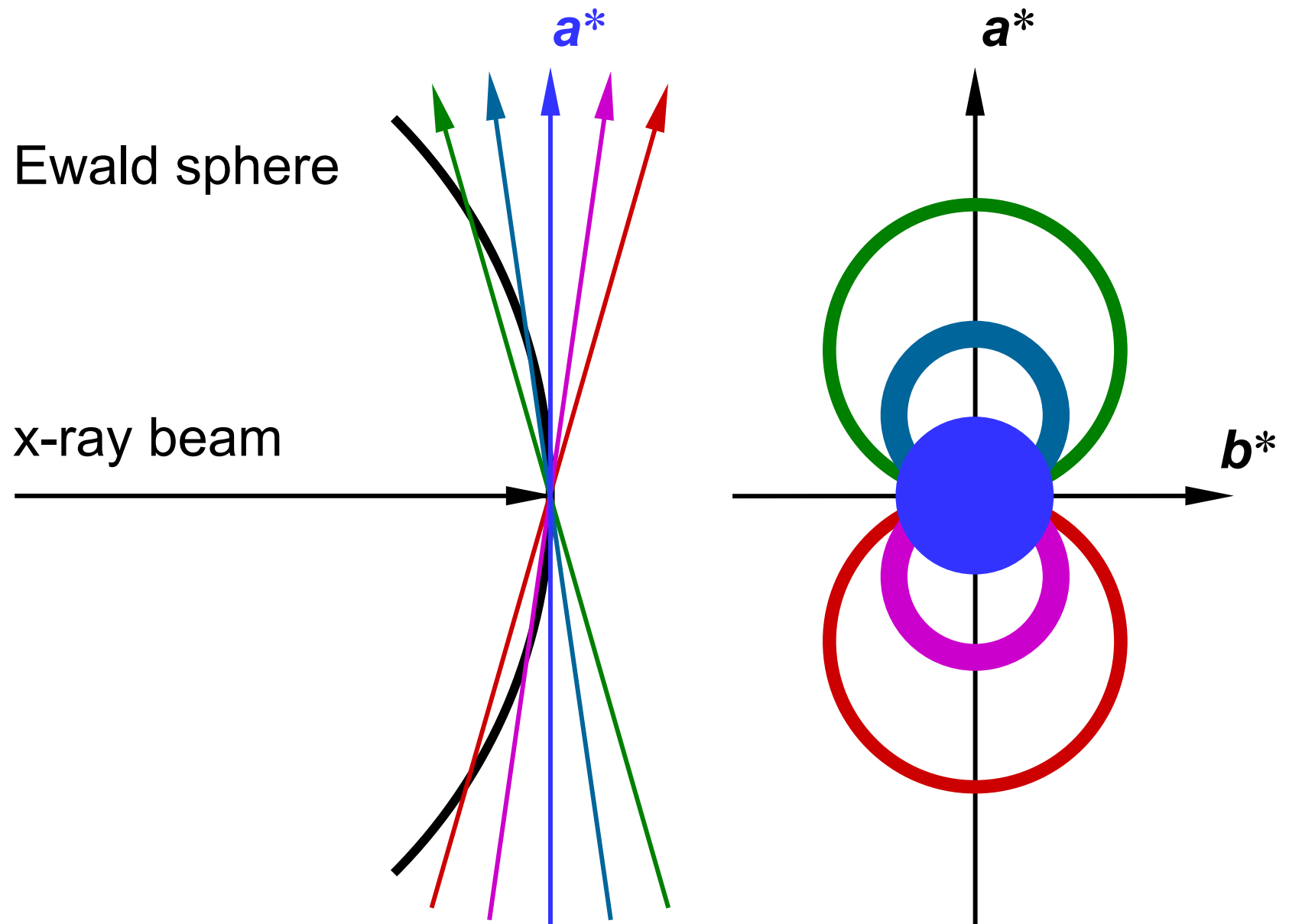
Tetragonal-orthorhombic distortion studied by diffraction



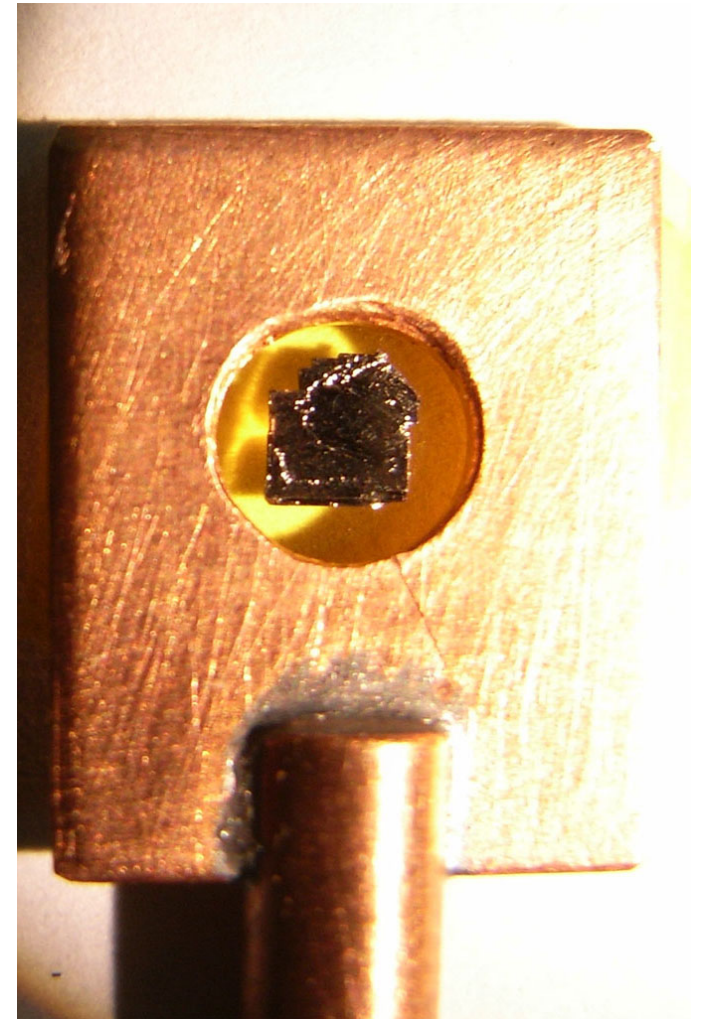
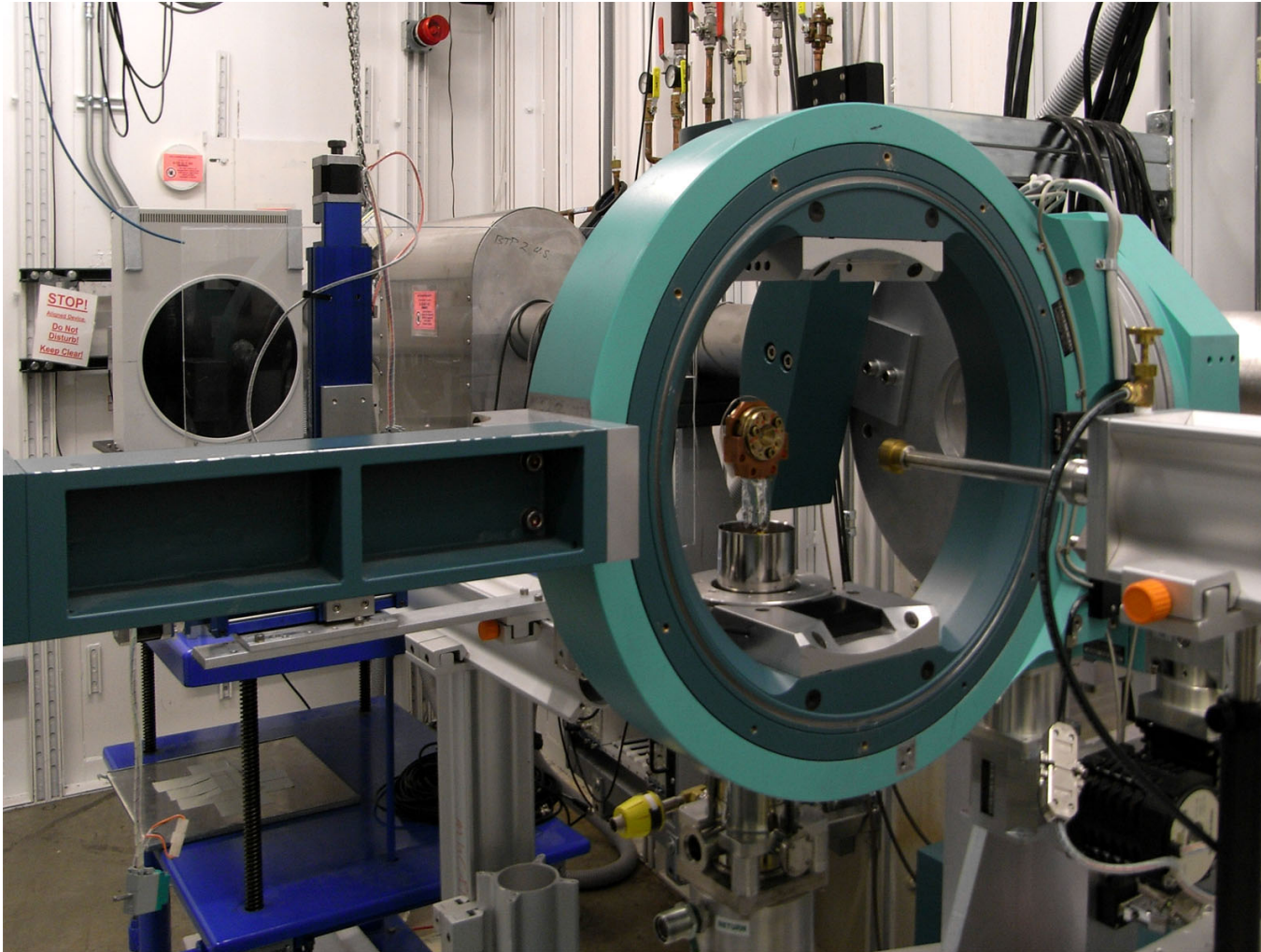
Imaging of reciprocal planes by high-energy x-ray diffraction



Imaging of reciprocal planes by high-energy x-ray diffraction

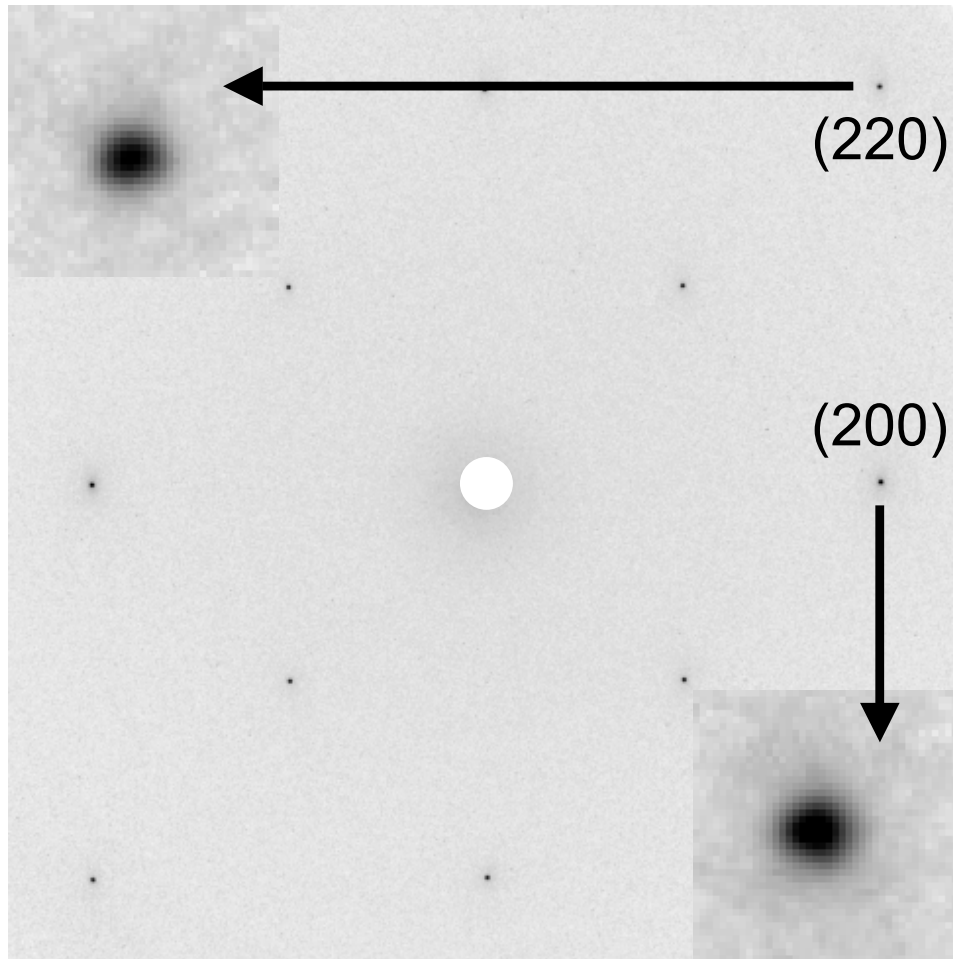


Imaging of reciprocal planes by high-energy x-ray diffraction

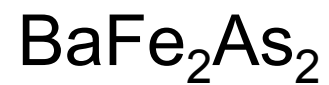
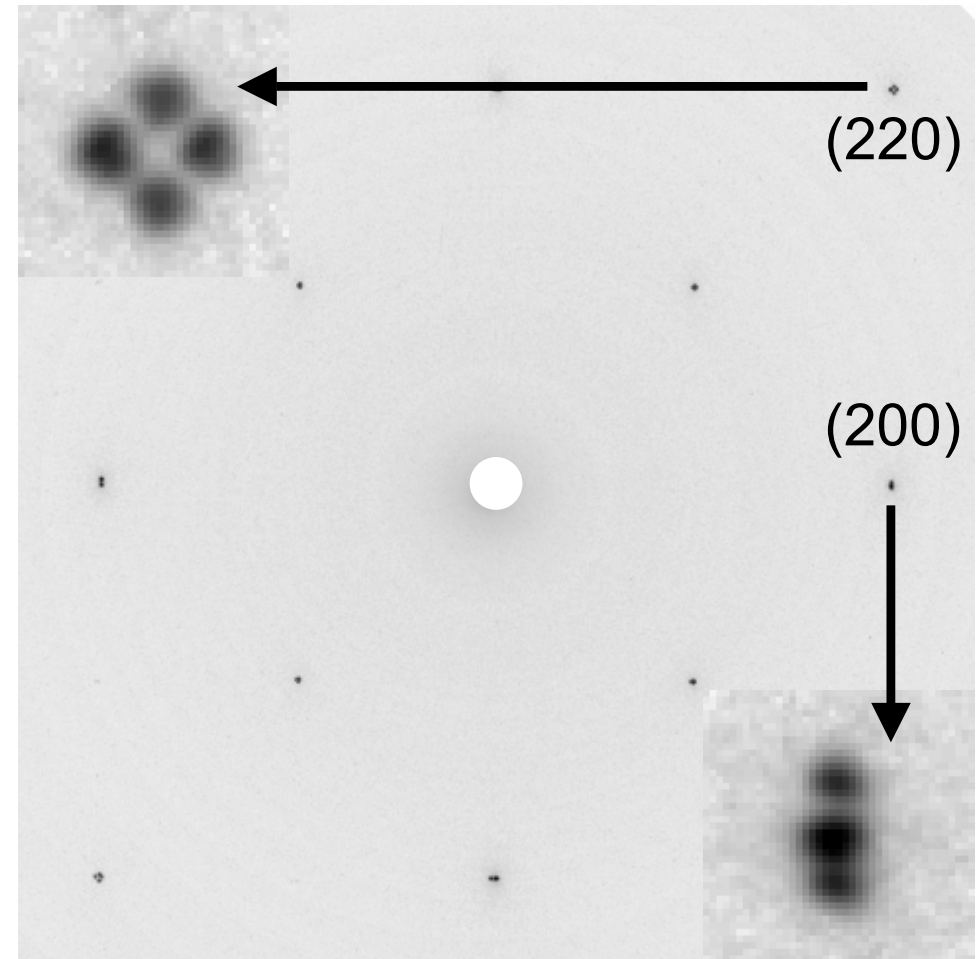


Imaging of reciprocal planes by high-energy x-ray diffraction

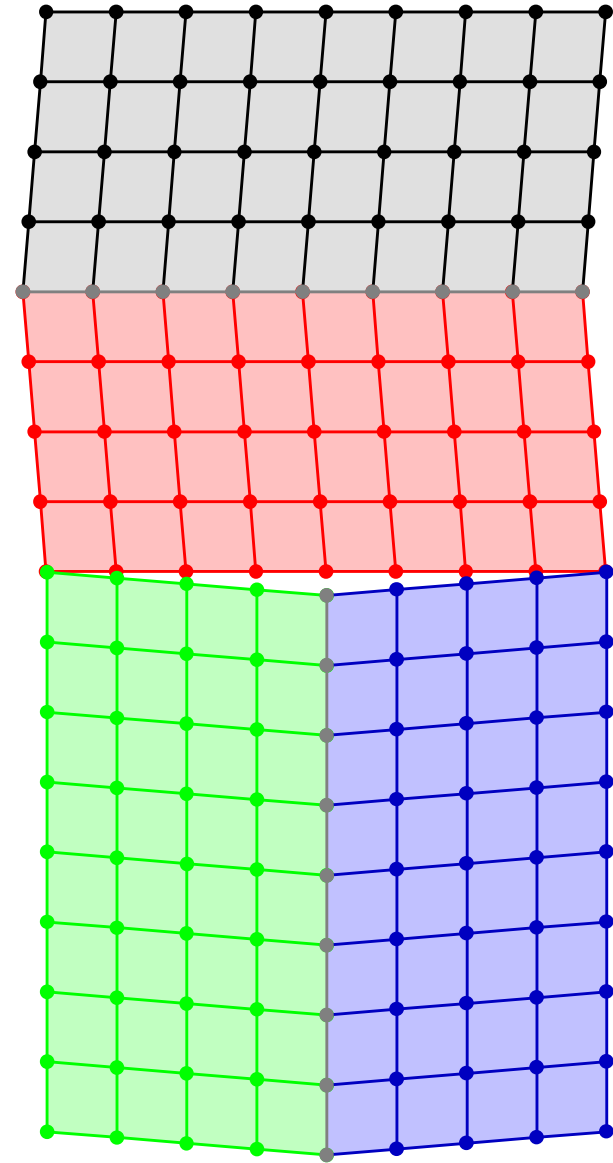
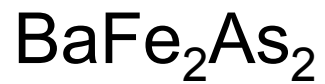
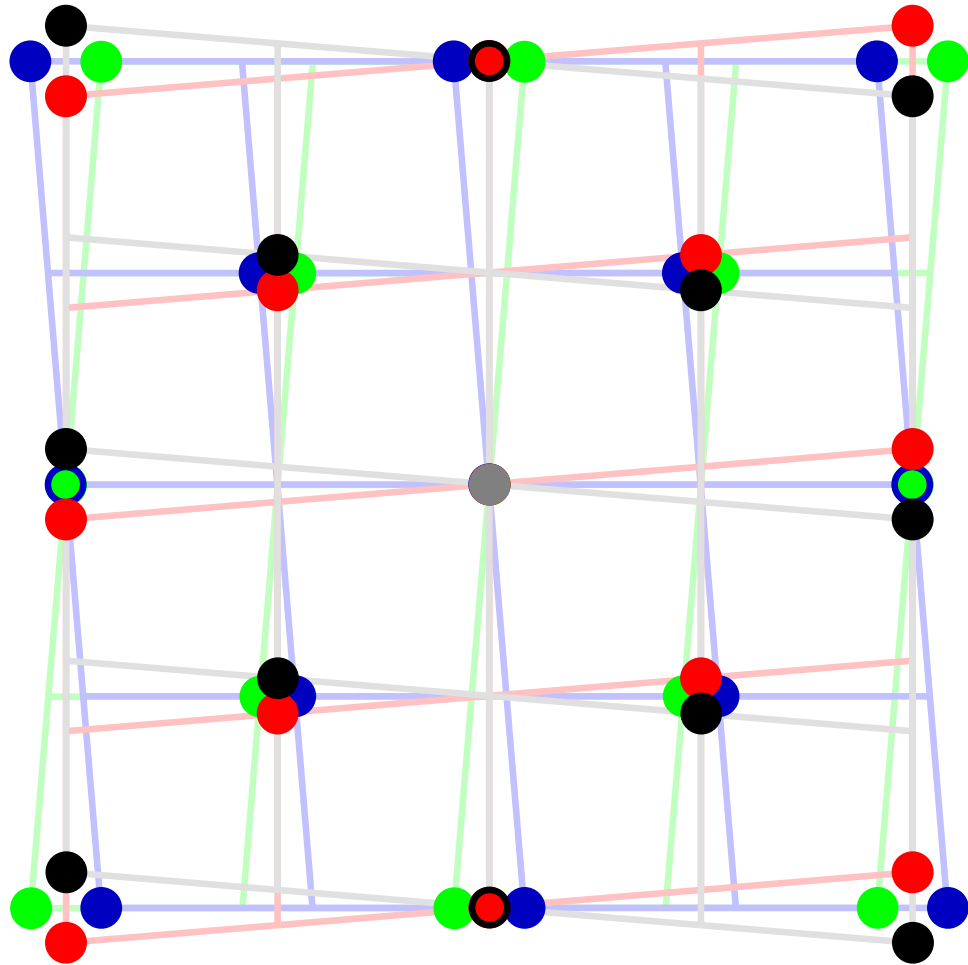
$T = 300 \text{ K}$



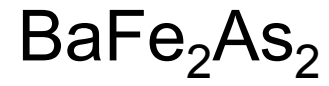
$T = 10 \text{ K}$



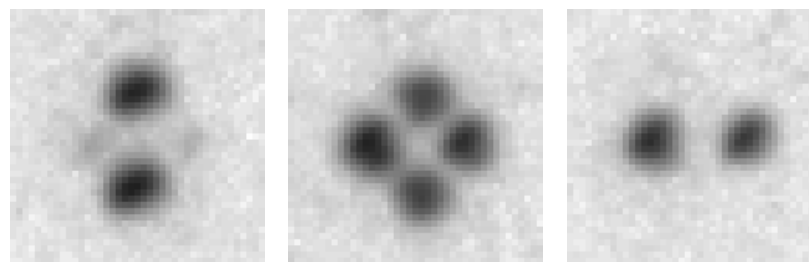
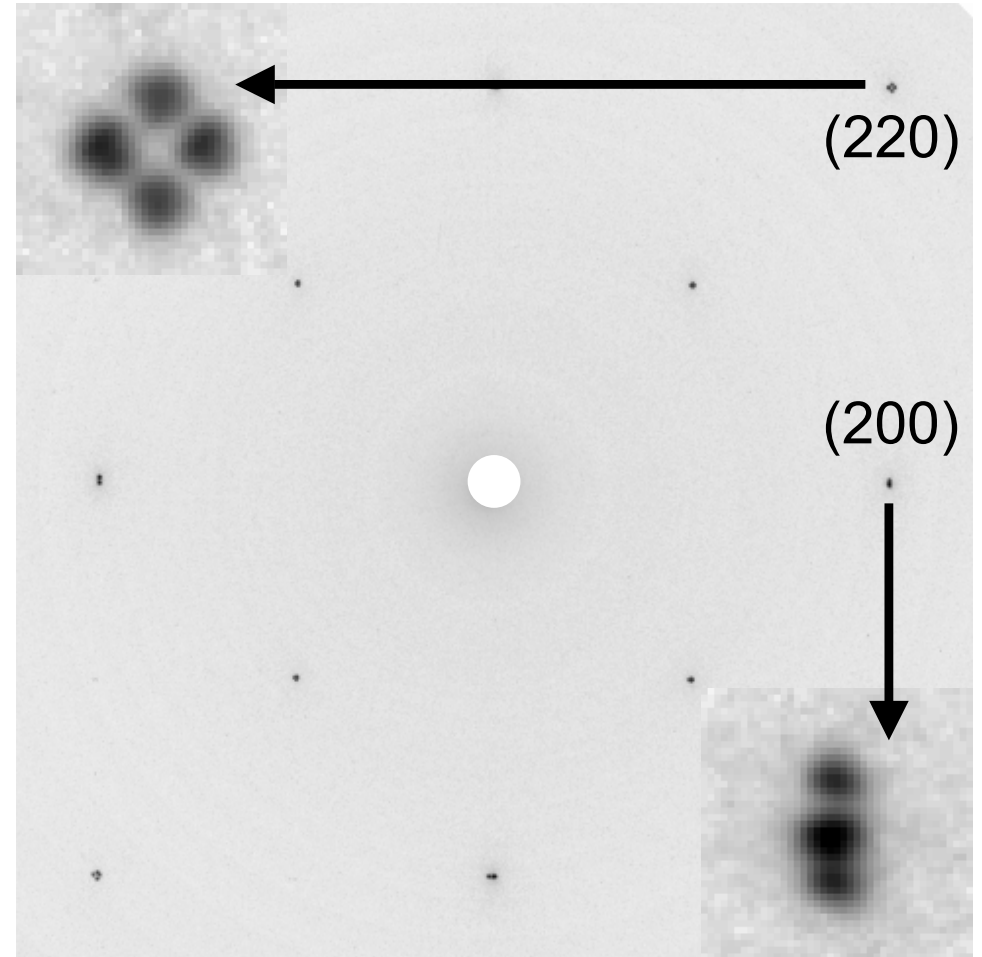
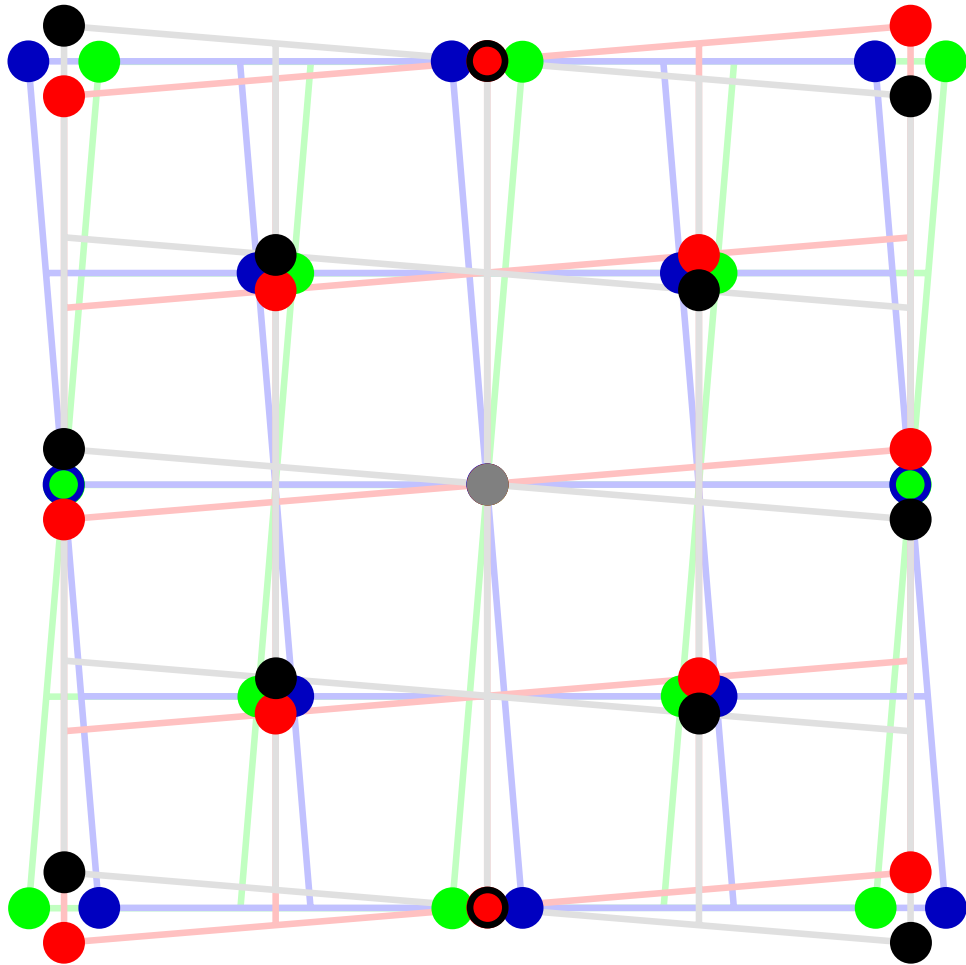
Imaging of reciprocal planes by high-energy x-ray diffraction



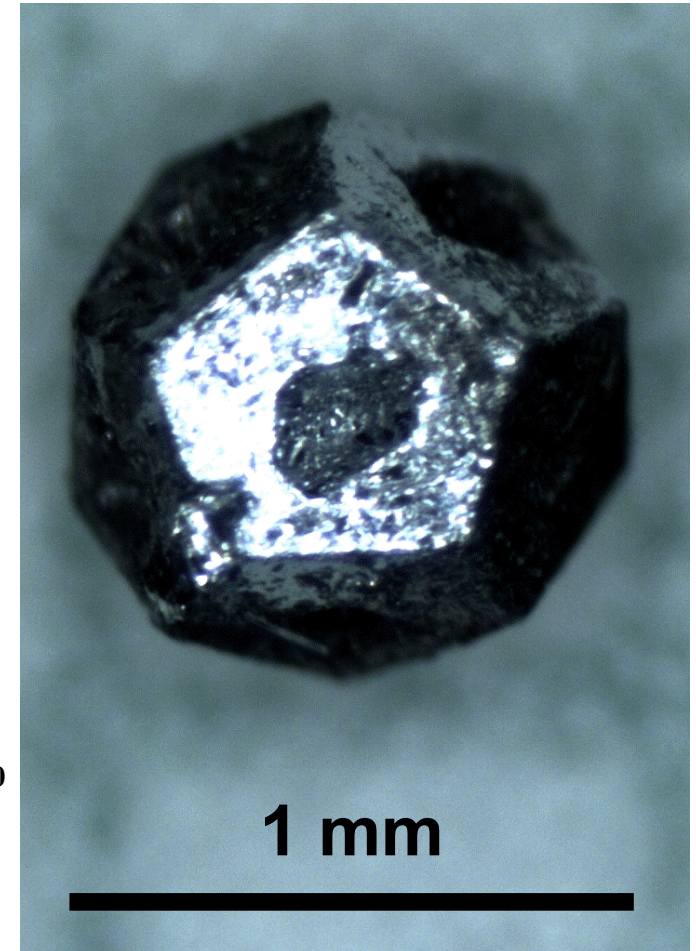
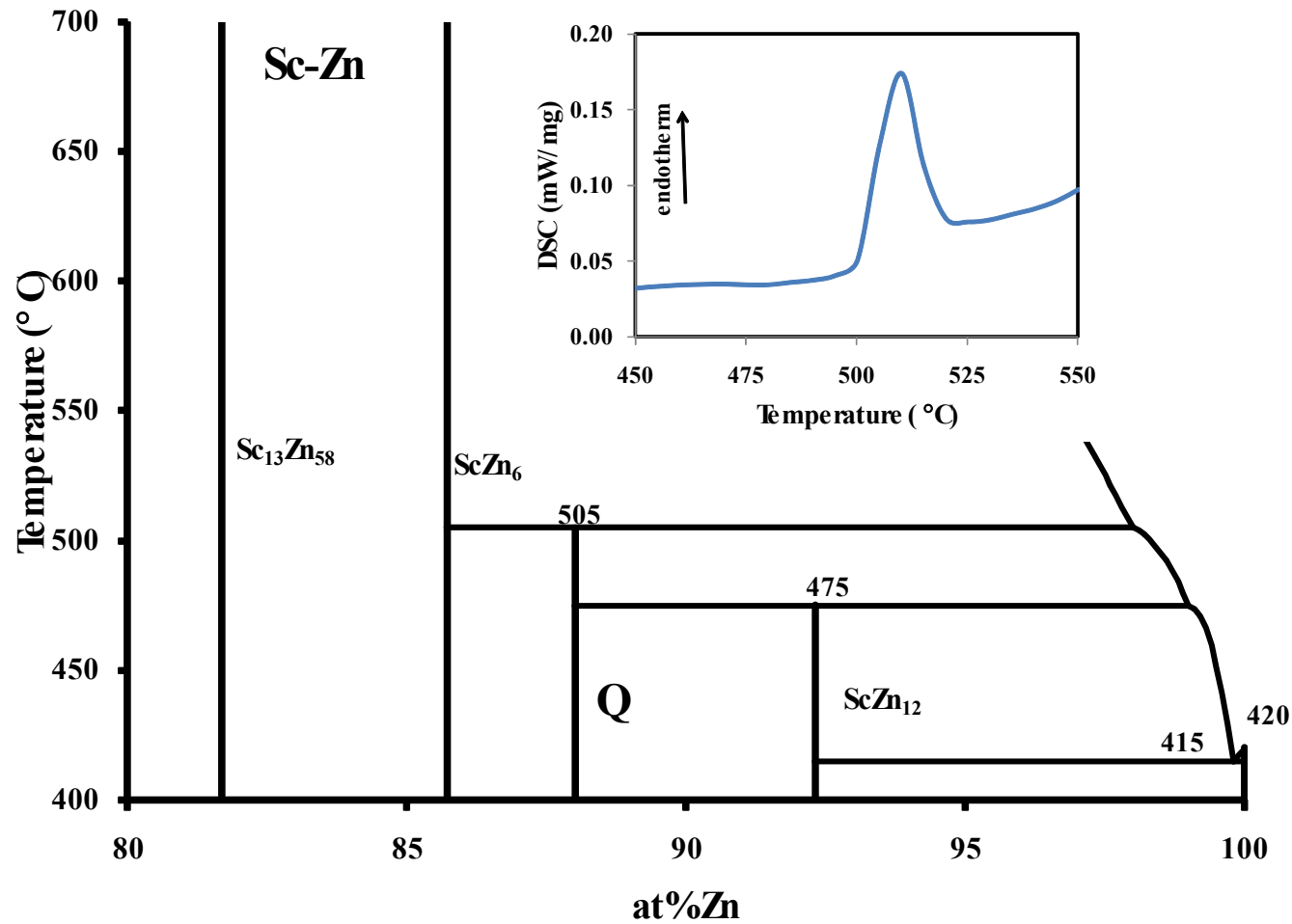
Imaging of reciprocal planes by high-energy x-ray diffraction



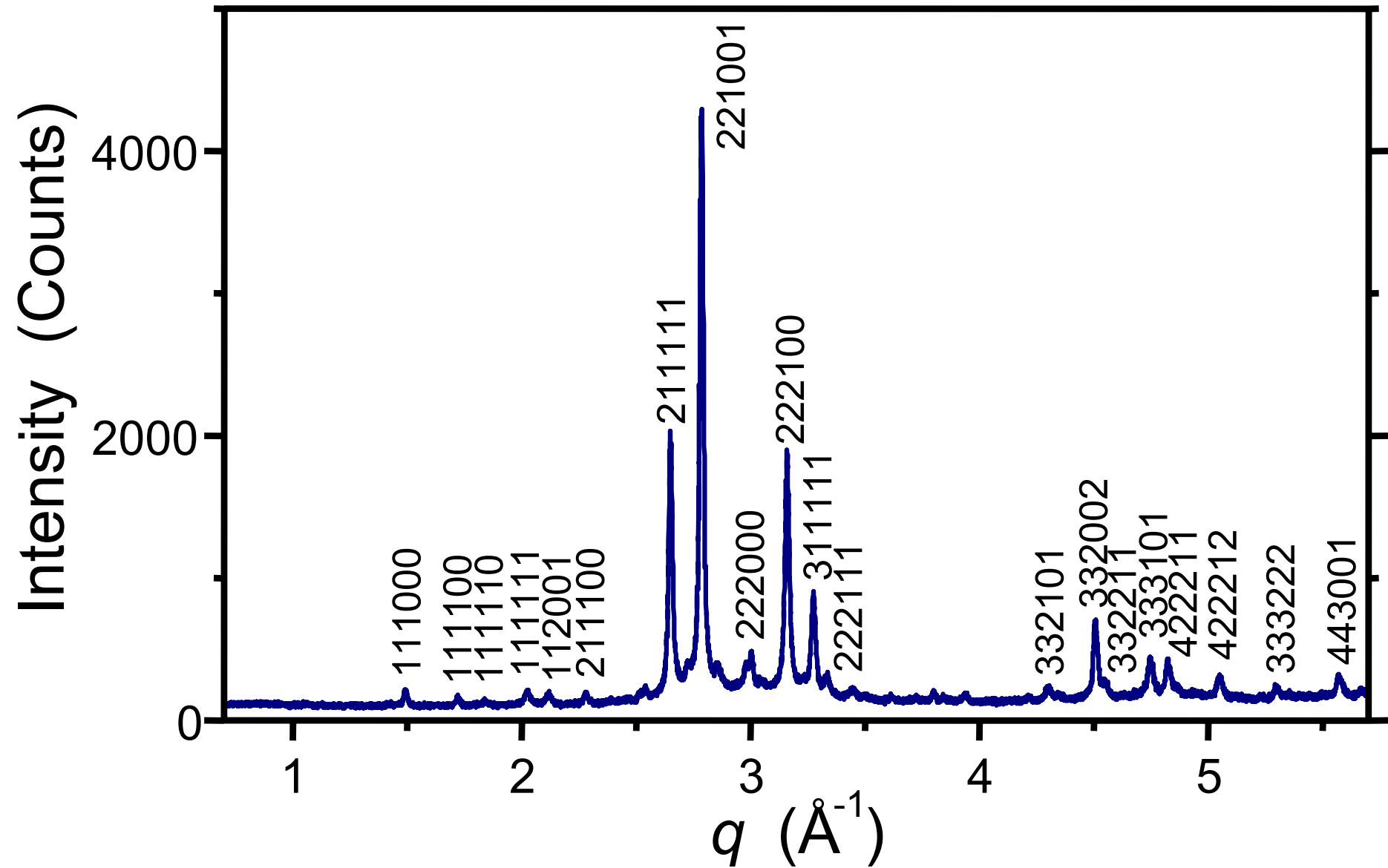
$T = 10 \text{ K}$



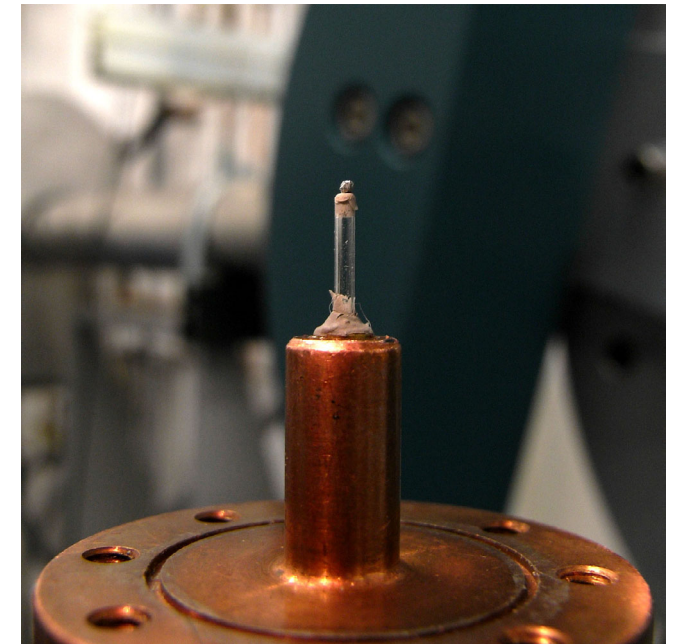
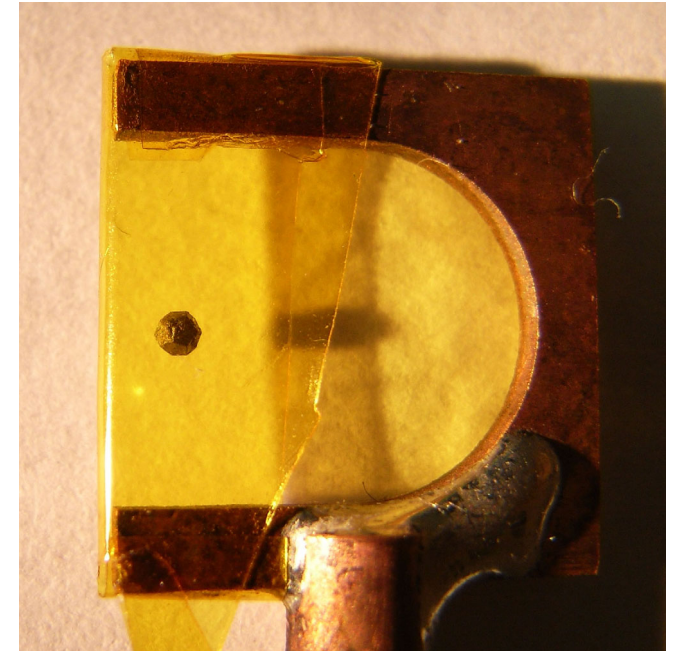
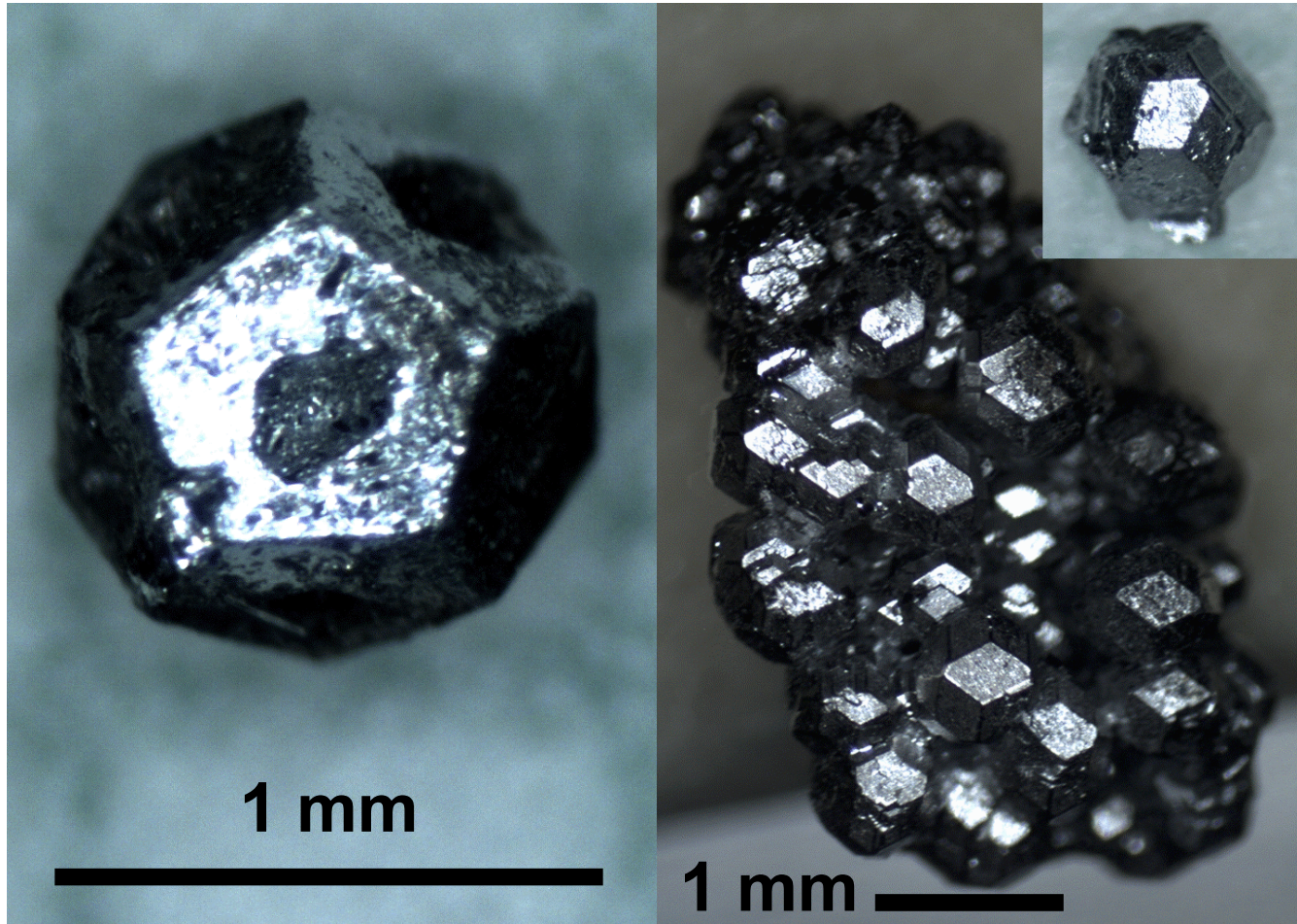
Surprise in the study of the Sc-Zn phase diagram



Surprise in the study of the Sc-Zn phase diagram

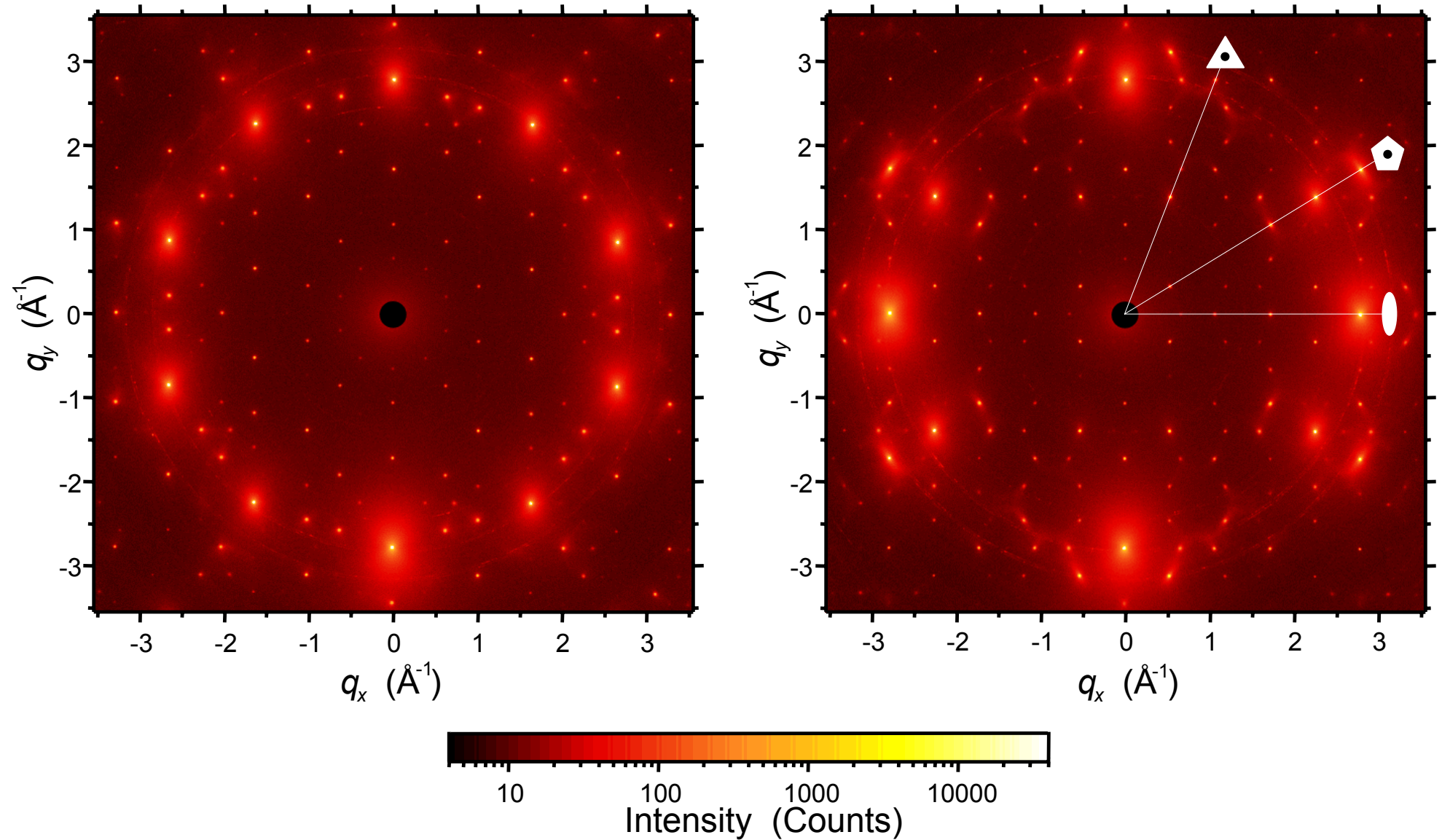


Imaging of reciprocal planes by high-energy x-ray diffraction



Sc-Zn

Imaging of reciprocal planes by high-energy x-ray diffraction



Sc-Zn