Information for MS 125 - Advanced Transmission Electron Microscopy

Prerequisites: MS 132 (Diffraction and Structure) and MS/Aph 122 (Diffraction Imaging and Structure)

Course Purpose:

a) High-resolution imaging and interpretation.
b) Stacking Fault Analysis and lattice parameter determination.

In addition to Fultz-Howe, useful reading on reserve in Millikan Library:

J. Cowley, Diffraction Physics
J. C. H. Spence, Experimental High Resolution Electron Microscopy
High-resolution transmission electron microscopy and associated techniques / edited by P. Buseck, J. Cowley, and L. Eyring
L. Reimers Transmission Electron Microscopy

Class will meet on Monday 10 am, Rm 111, Keck

Laboratory will meet in B242F Keck.
Laboratory sessions are 8:00-12:00 and 1:00-5:00 on Tuesday through Thursday.
Student to attend 1 microscope session every week and to complete the lab assignments (due in notebook at mid-term and end of term).

Weeks 1-2: Dynamical effects, Stacking Fault nature and energies and in Cu-Al

Weeks 3-6: The Physical optics approach to high-resolution imaging
Contrast Transfer Function and resolution limits
High-resolution imaging of Si.
Matching images to theory, the multislice method.

Week 7: $Ti_2Nb_{10}O_{29}$.

Week 8: Convergent beam electron diffraction.
high accuracy lattice parameter measurements by electron diffraction.

Week 9: Z-contrast imaging
Rutherford scattering and angle dependence

Personnel:
Instructor: C. Ahn, Rm 231 Keck, x2174 cca@caltech.edu
Carol Garland, Rm B242C Keck, x2168, cmg@caltech.edu