Introduction to Macromolecular X-ray Crystallography

Biochem 300

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Print and online resources:

Introduction to Macromolecular X-ray Crystallography, by Alexander McPherson

Crystallography Made Crystal Clear, by Gale Rhodes
http://www.usm.maine.edu/~rhodes/CMCC/index.html

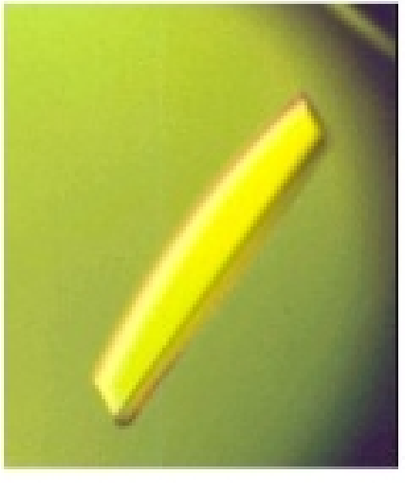
http://ruppweb.dyndns.org/Xray/101index.html
Online tutorial with interactive applets and quizzes.

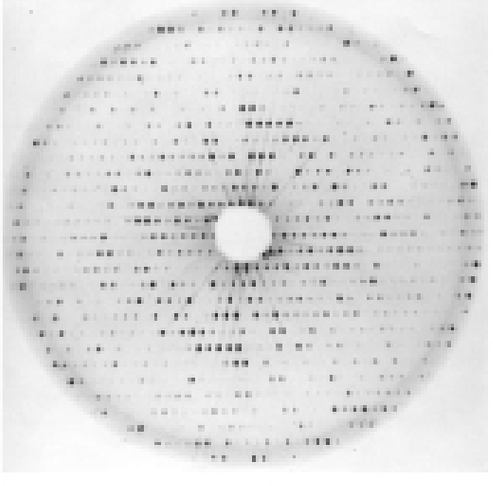
http://www.ysbl.york.ac.uk/~cowtan/fourier/fourier.html
Nice pictures demonstrating Fourier transforms

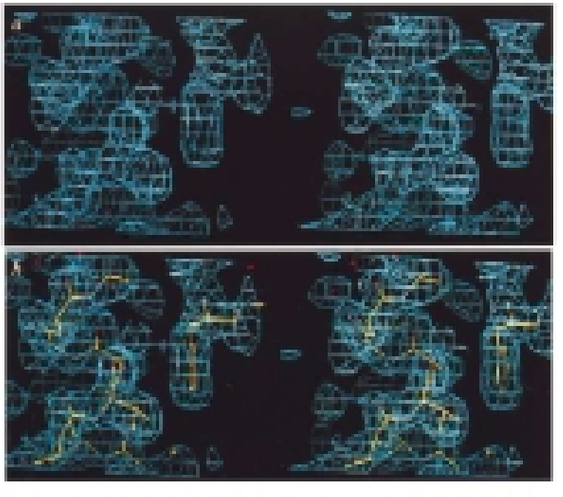
http://ucxray.berkeley.edu/~jamesh/movies/
Cool movies demonstrating key points about diffraction, resolution, data quality, and refinement.

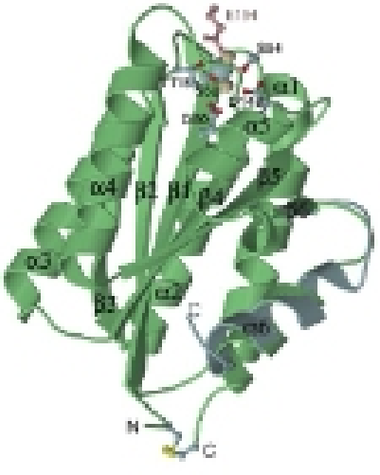
http://www-structmed.cimr.cam.ac.uk/course.html
Notes from a macromolecular crystallography course taught in Cambridge

Overview of X-ray Crystallography







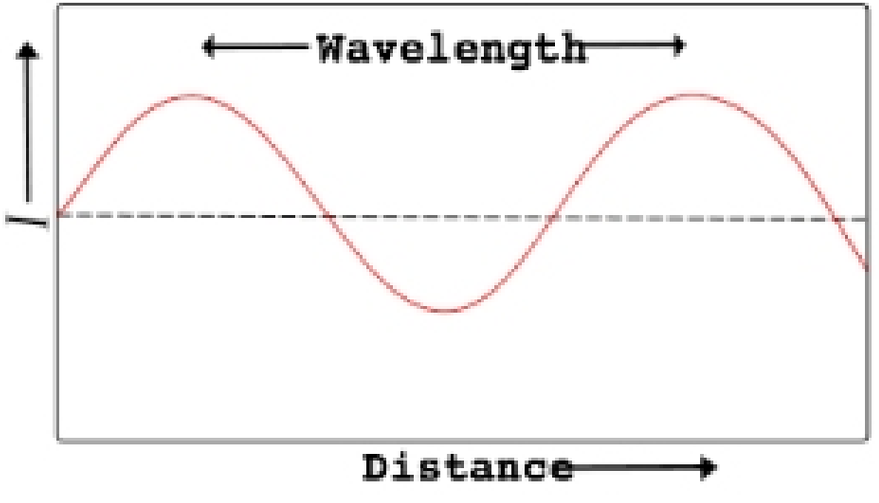


Crystal -> Diffraction pattern -> Electron density -> Model

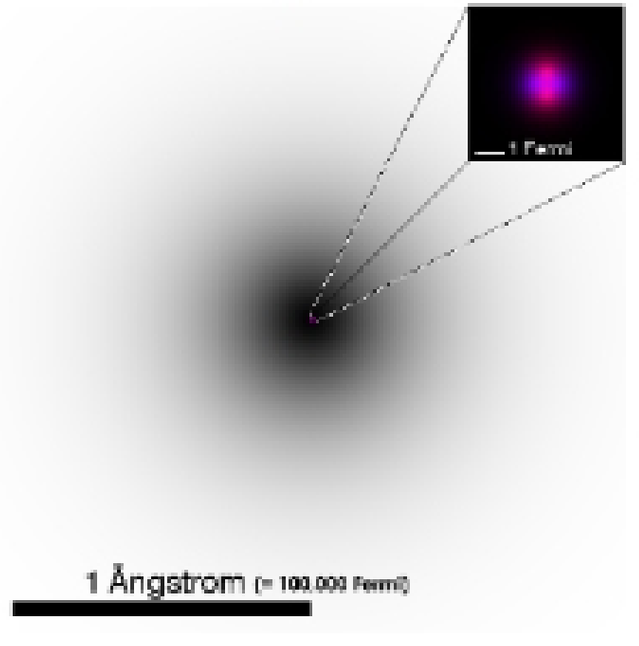
Resolution, Fourier transforms, the 'phase problem', B-factors,
R-factors, R-free …

Diffraction: The interference caused by an object in the path of waves
(sound, water, light, radio, electrons, neutron..)
Observable when object size similar to wavelength.

Wave



Object



Visible light: 400-700 nm
X-rays: 0.1-0.2 nm, 1-2 Å