Thur. Oct 24, 2013: elastic light scattering

Properties of light, how light interacts with matter, and how light interacts with itself.
Reference material: "Elastic Scattering" web **Notes** on kinemage website:
http://kinemage.biochem.duke.edu/teaching/BCH681/2013BCH681/

...continuing: **Second Issue:** Scattering from 2 or more points (and the object small compared to wavelength of light).

Notes Section 2. Molecular Scatter, Section 3. Bragg Diffraction

Information from an elastic light scattering experiment: **distance, direction**.
[and the simple concept of two waves completely in phase, i.e. peaks line up perfectly.]
Study question: general diagram directly measuring **distance** between 2 objects at a particular arbitrary **direction** from each other. Confirm Bragg's law, $\lambda = 2d\sin(\theta)$, symmetrical in---out rays, that for a particular wave length produce in-phase output. Also show $n\lambda = 2d\sin(\theta)$ {show phase clocks}

Afterwards show d normal to "Bragg Planes" on which any point would scatter in phase with Bragg's law. (and any scattering points off-of-plane by the same amount would be in phase with each other)

Recall:
COMBINATION OF [X-RAY : LIGHT] WAVES
VECTOR NOTATION FOR WAVES The phase clock

and on to the General Scattering Equation... (introduce today, further develop next time)

There are 2 really important equations concerning elastic light scattering:
1) Bragg equation: fundamental relationship of distance and direction.
We'll try to get a good feel for these relationships...
2) General scattering equation: basis of all analyses ... form is Fourier Transform, very powerful!
We'll introduce this as an outgrowth of our Bragg equation work, and show what the terms and factors mean for understanding scattering by molecules.