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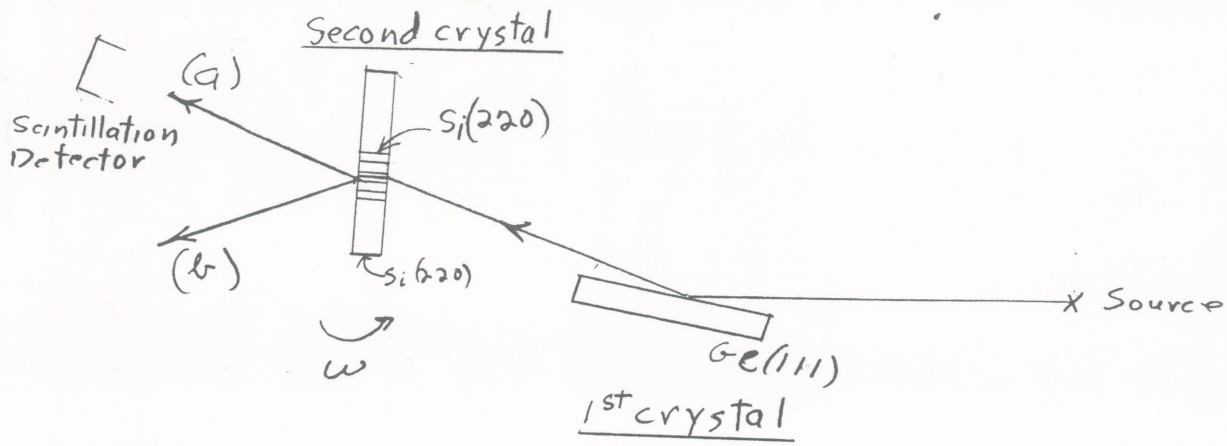
X-8
Anomalous Transmission of X-Rays
The Borrmann Effect



Using CuK_α radiation and a germanium (111) reflection as a primary beam, find the (220) reflection through a silicon slab in symmetric (220) reflection as indicated in the figure. Find both the forward diffracted beam (a) and the diffracted (220) beam (b).

To facilitate the search for these reflections, you may first want to reflect the primary beam from the edge of the crystal picking up the strong (220) reflection Bragg peak from the crystal edge.

Record the diffraction curves of (a) and (b). Explain the doublet structure. (It is important to have both the Si(220) and the germanium (111) reflection parallel to the same vertical line).

Adjust tube voltage (below 20keV) and current (not to exceed 20 ma) for clean signals. Using x-ray film, record the diffracted and forward diffracted beam simultaneously. Translate the crystal out of the beam and take a fractional second exposure to locate the primary beam on the film (film must be unperturted from the previous exposure). Get a diffracted beam and measure the attenuation factor of a couple of .004" foils of Al. Use these foils to measure the intensity of the primary beam hitting the silicon crystal.