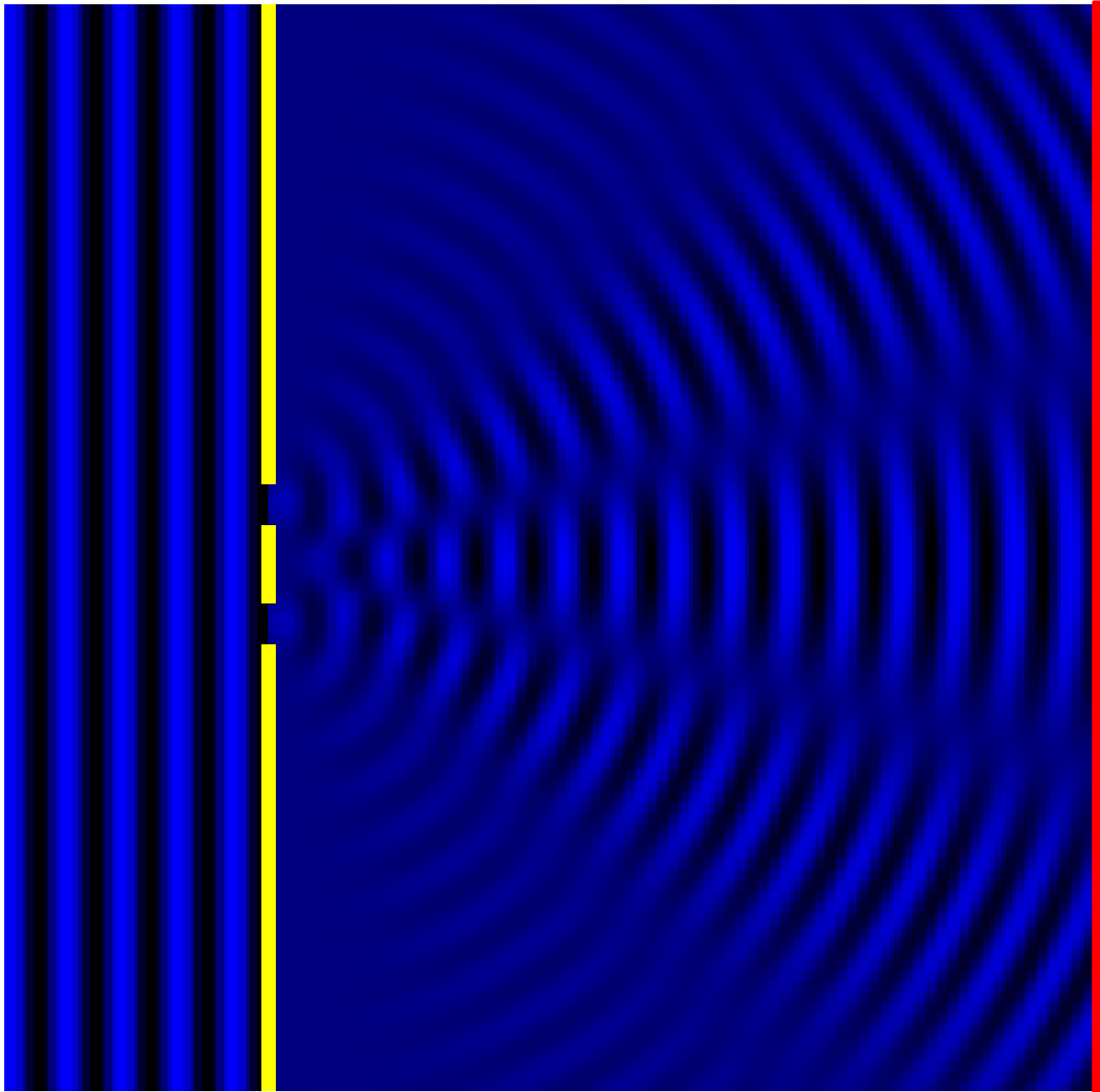


<https://commons.wikimedia.org/wiki/File:Wave-diffraction-2.gif>



Screen

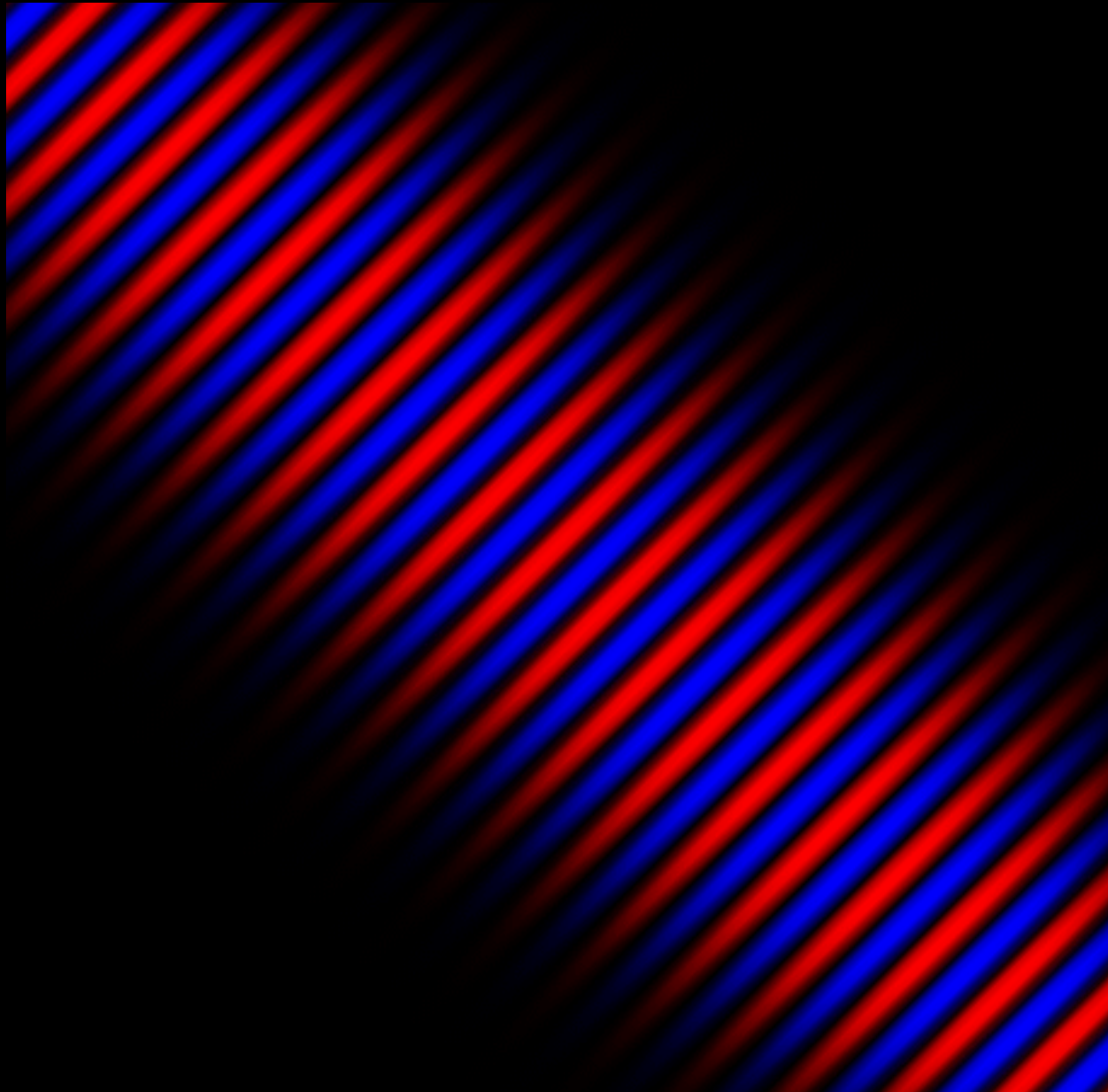
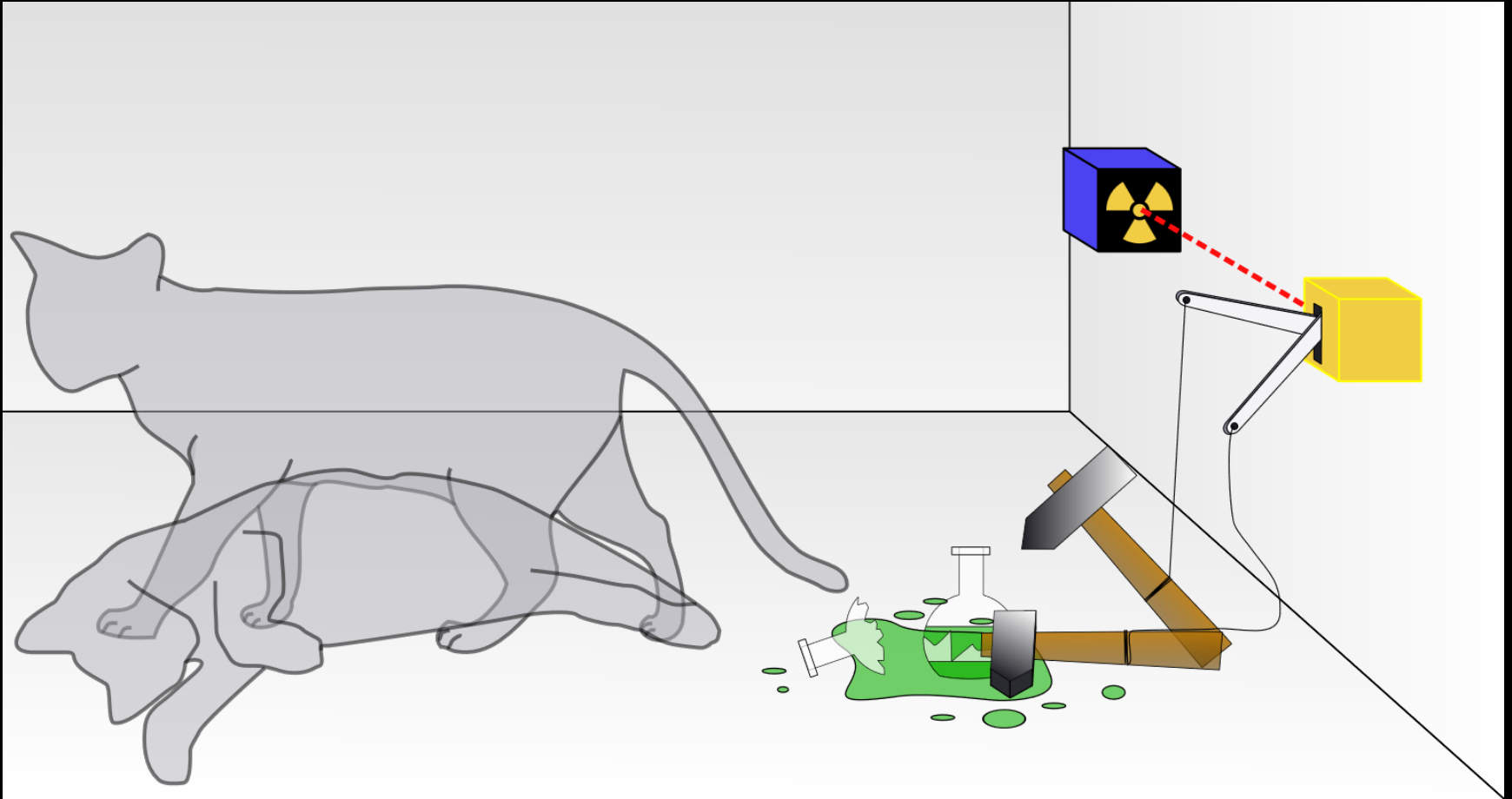


Image is "Bragg Diffraction" from Jacopo Bertolotti

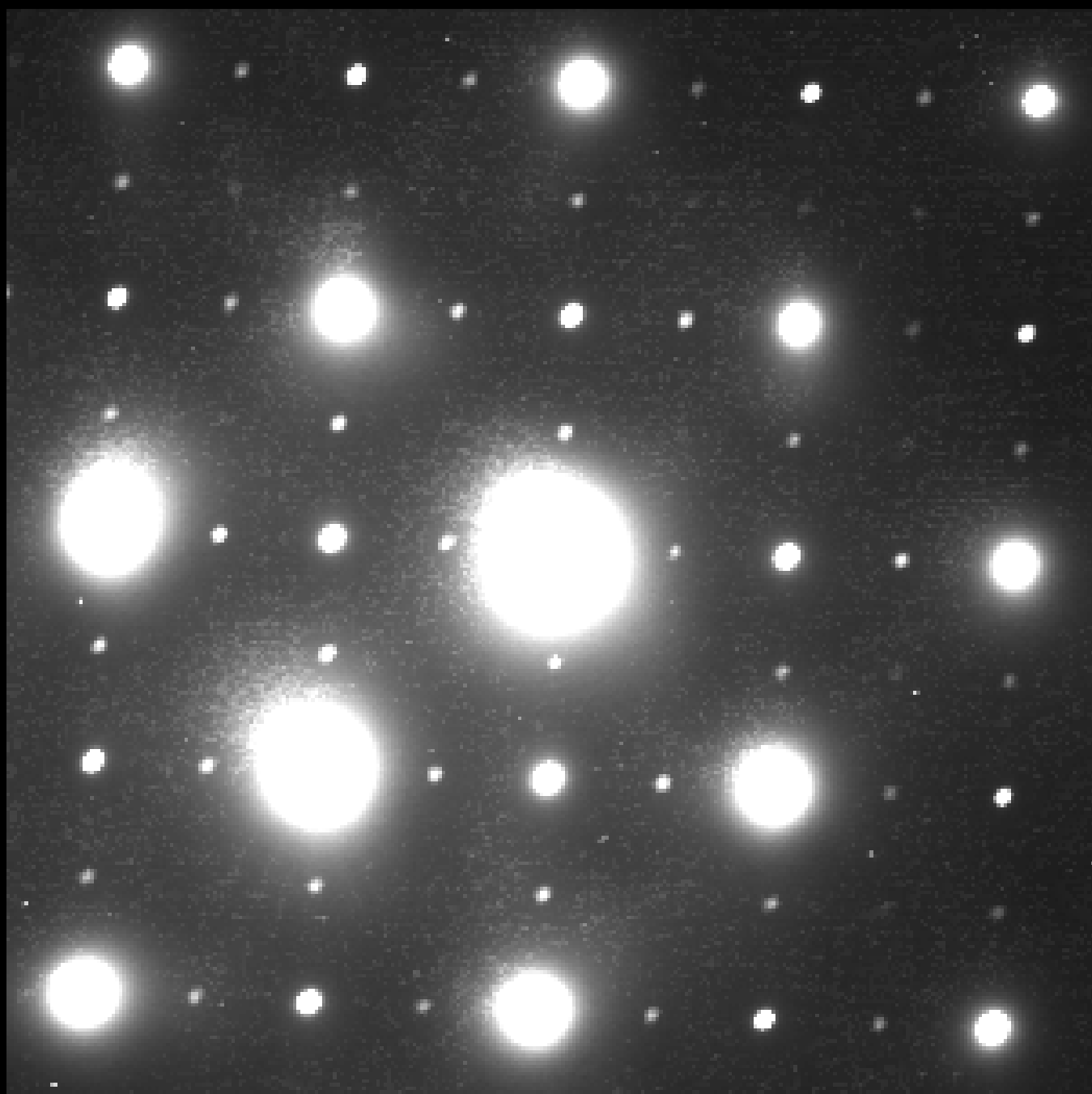
Schroedinger's Cat: Copenhagen interpretation

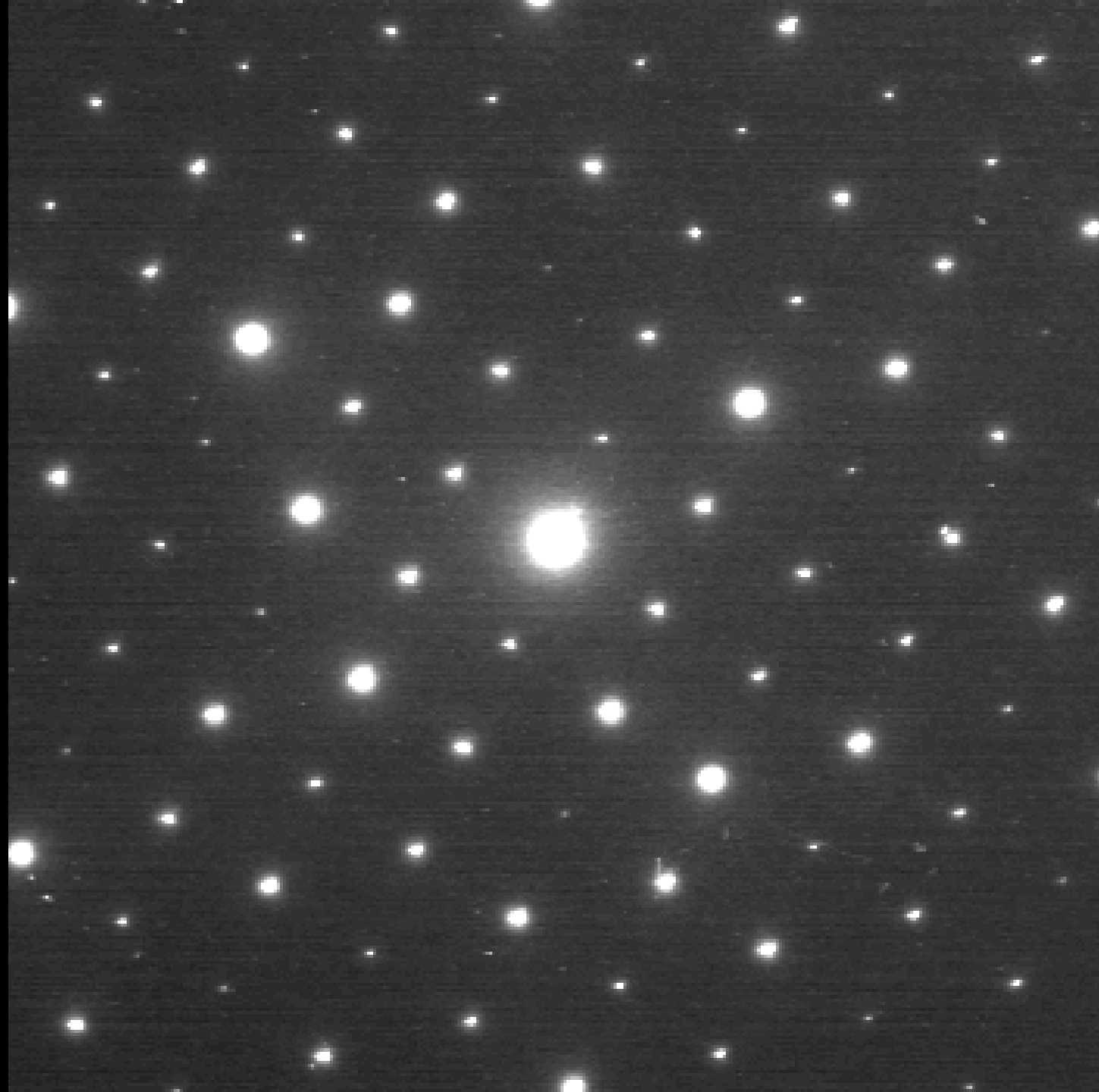


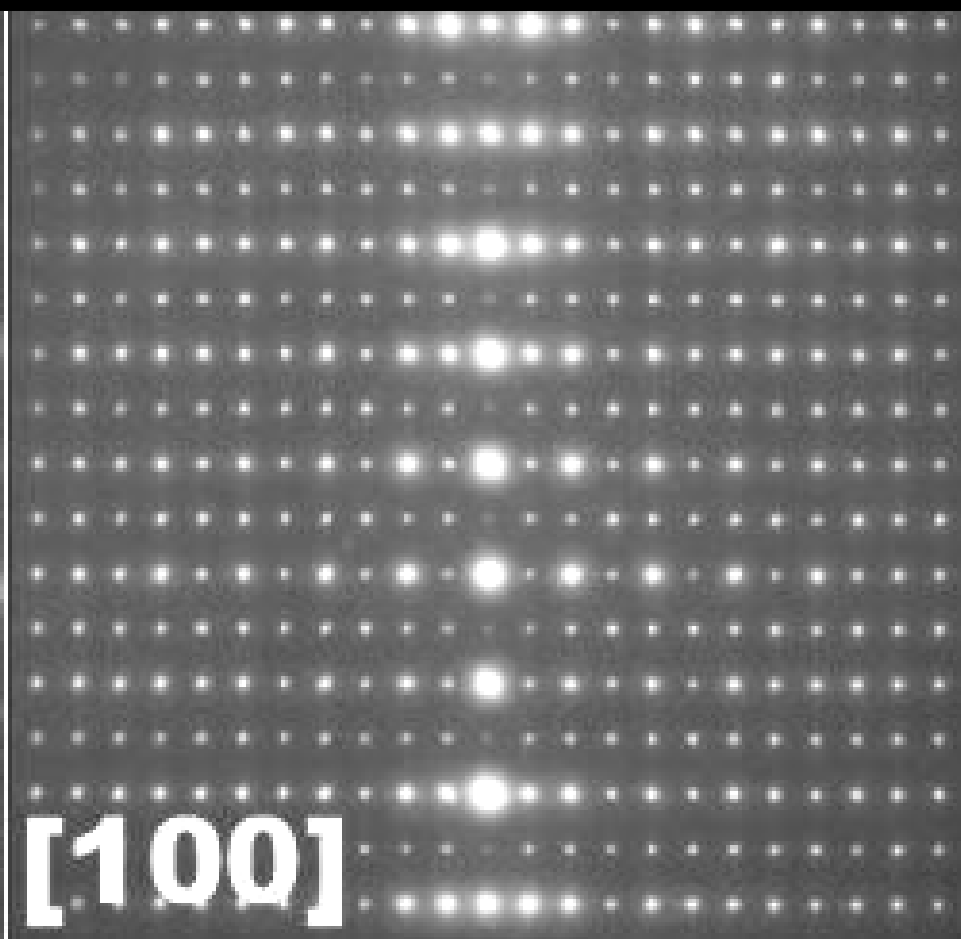
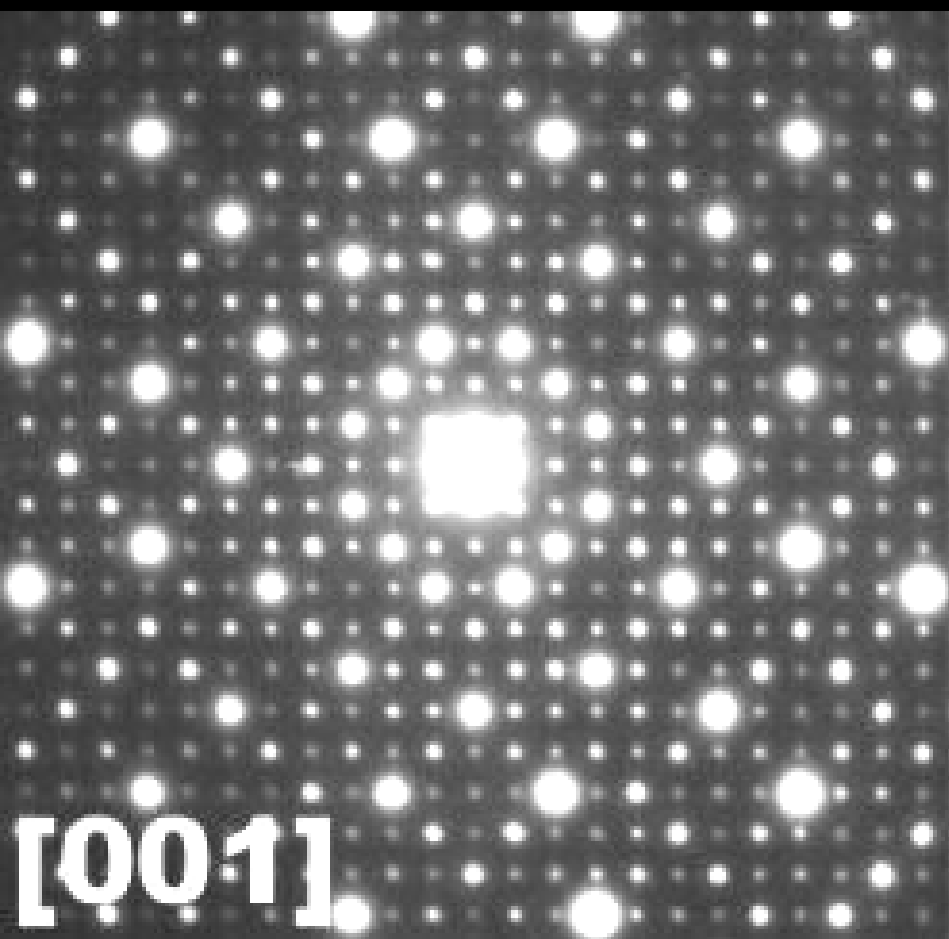
By Dhatfield - Own work, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=4279886>

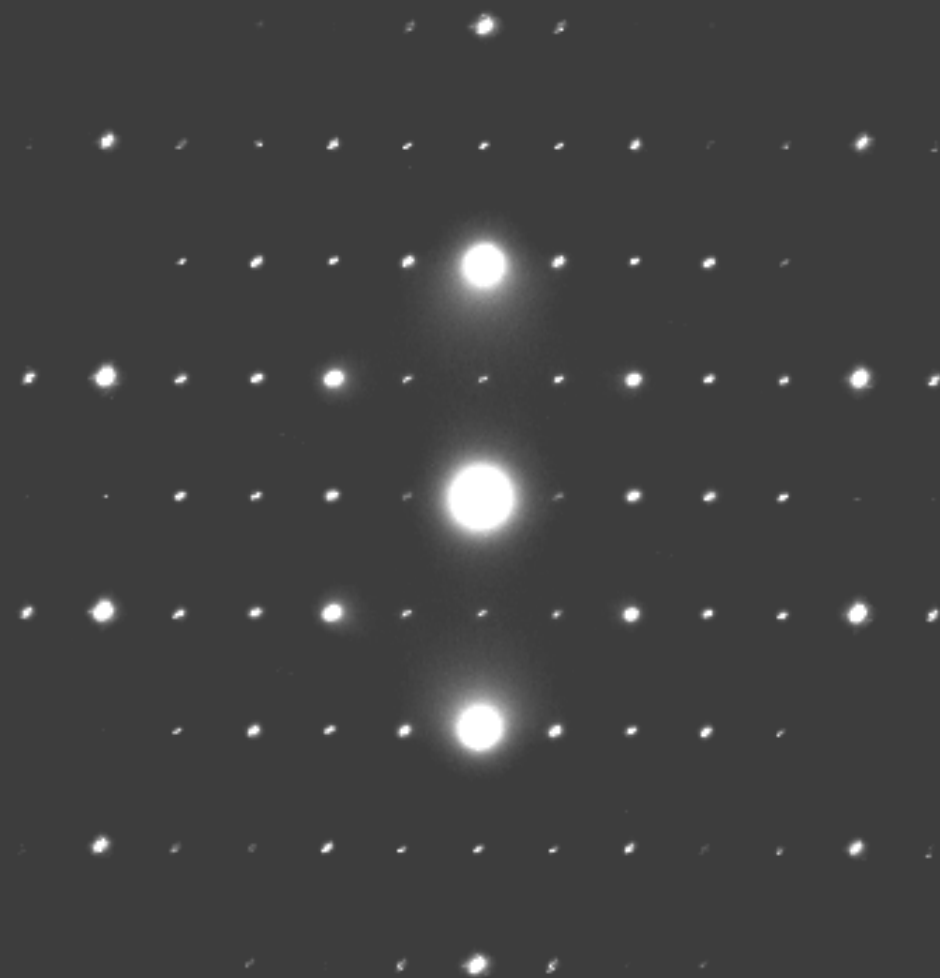
2-slit experiment; single electrons form interference statistically (Tonamura)







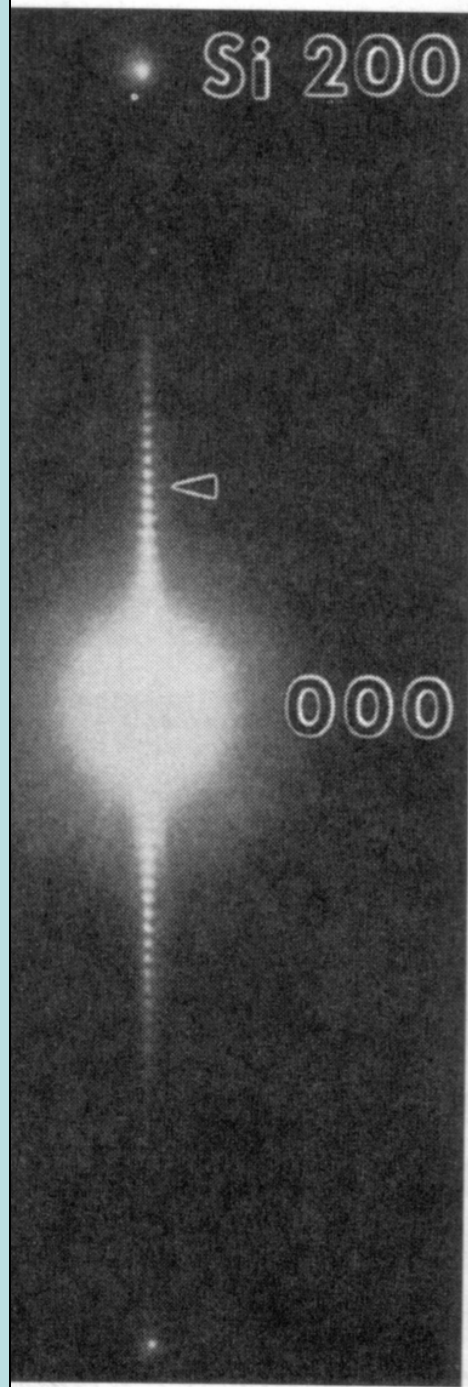




Si 200

△

000

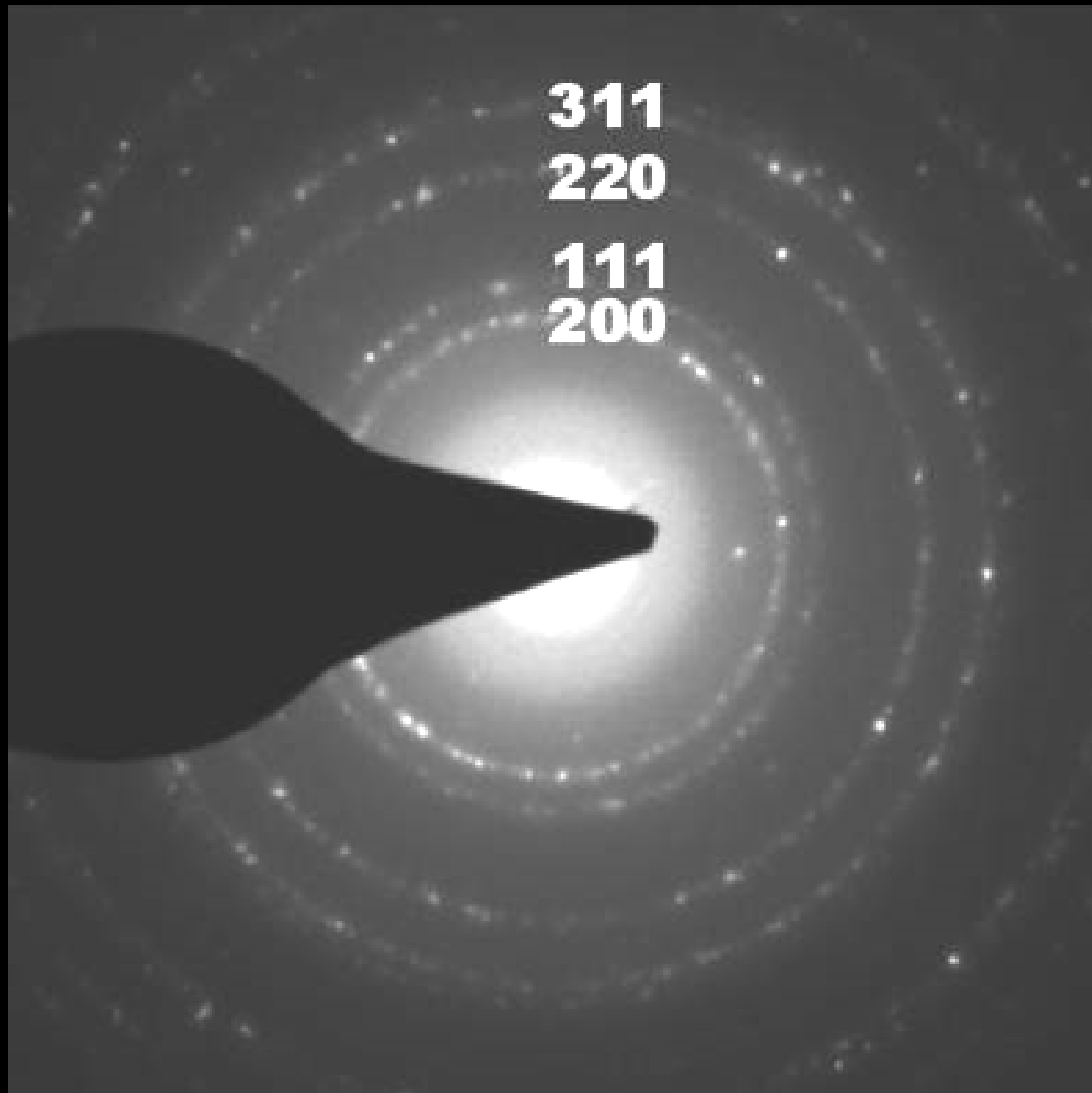


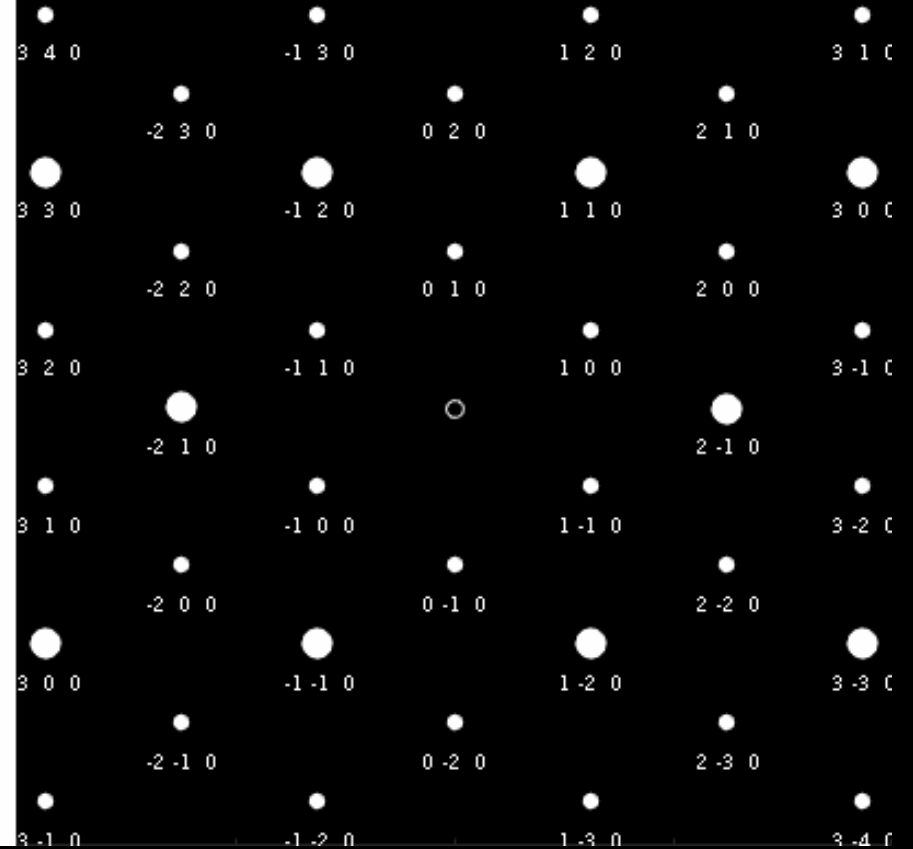
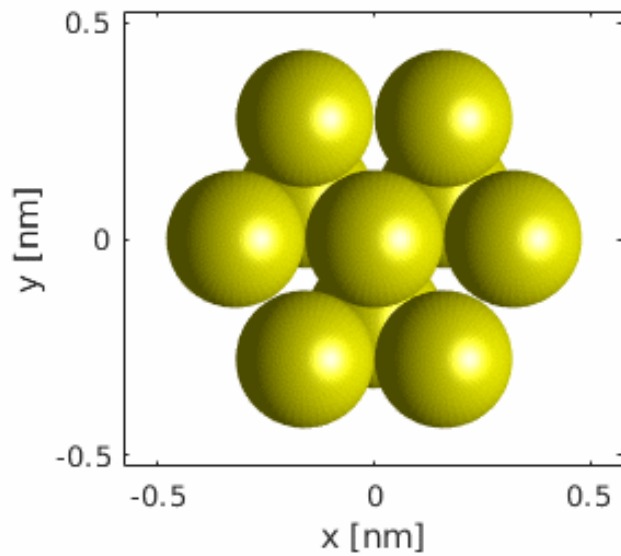
311

220

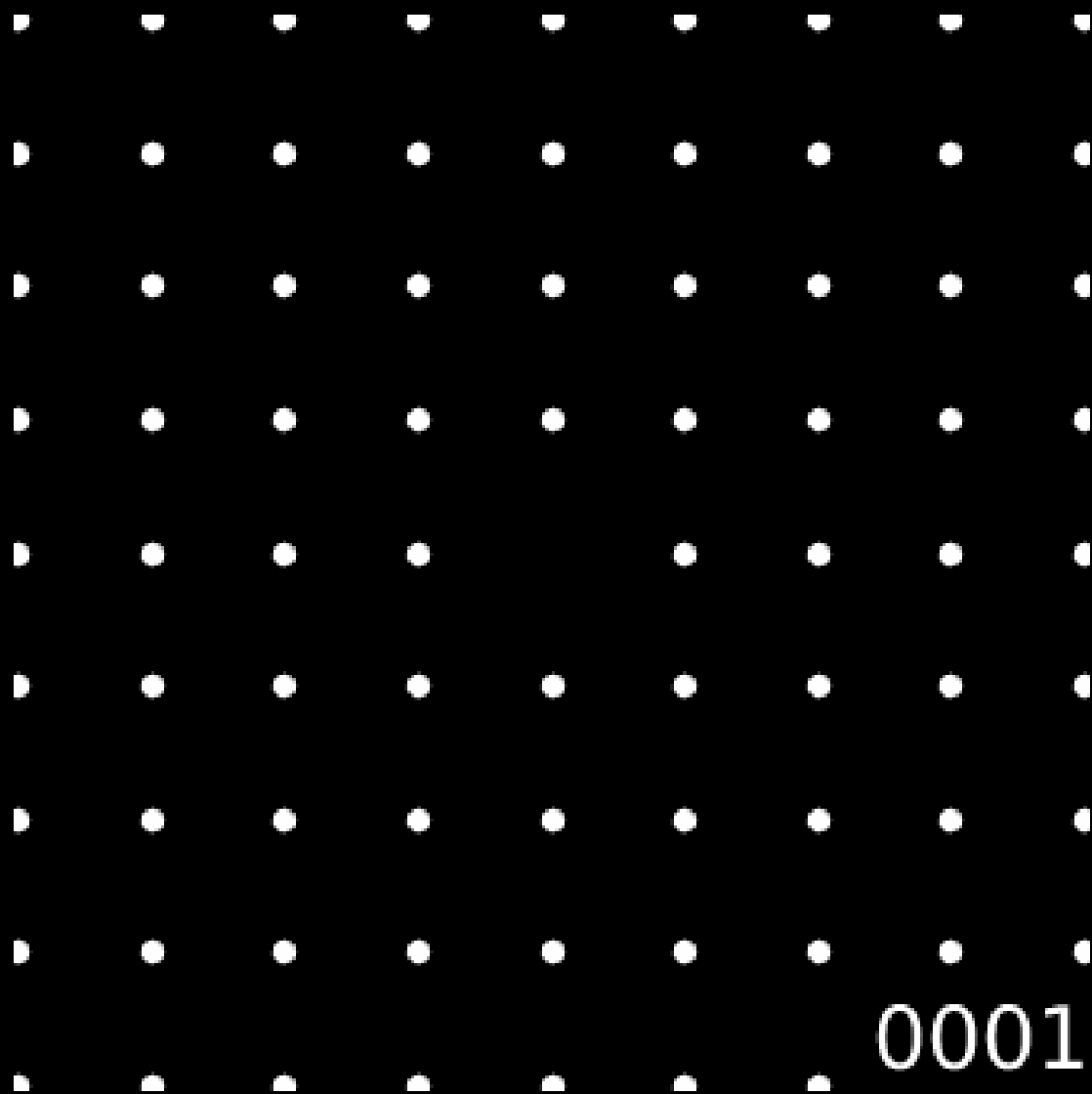
111

200



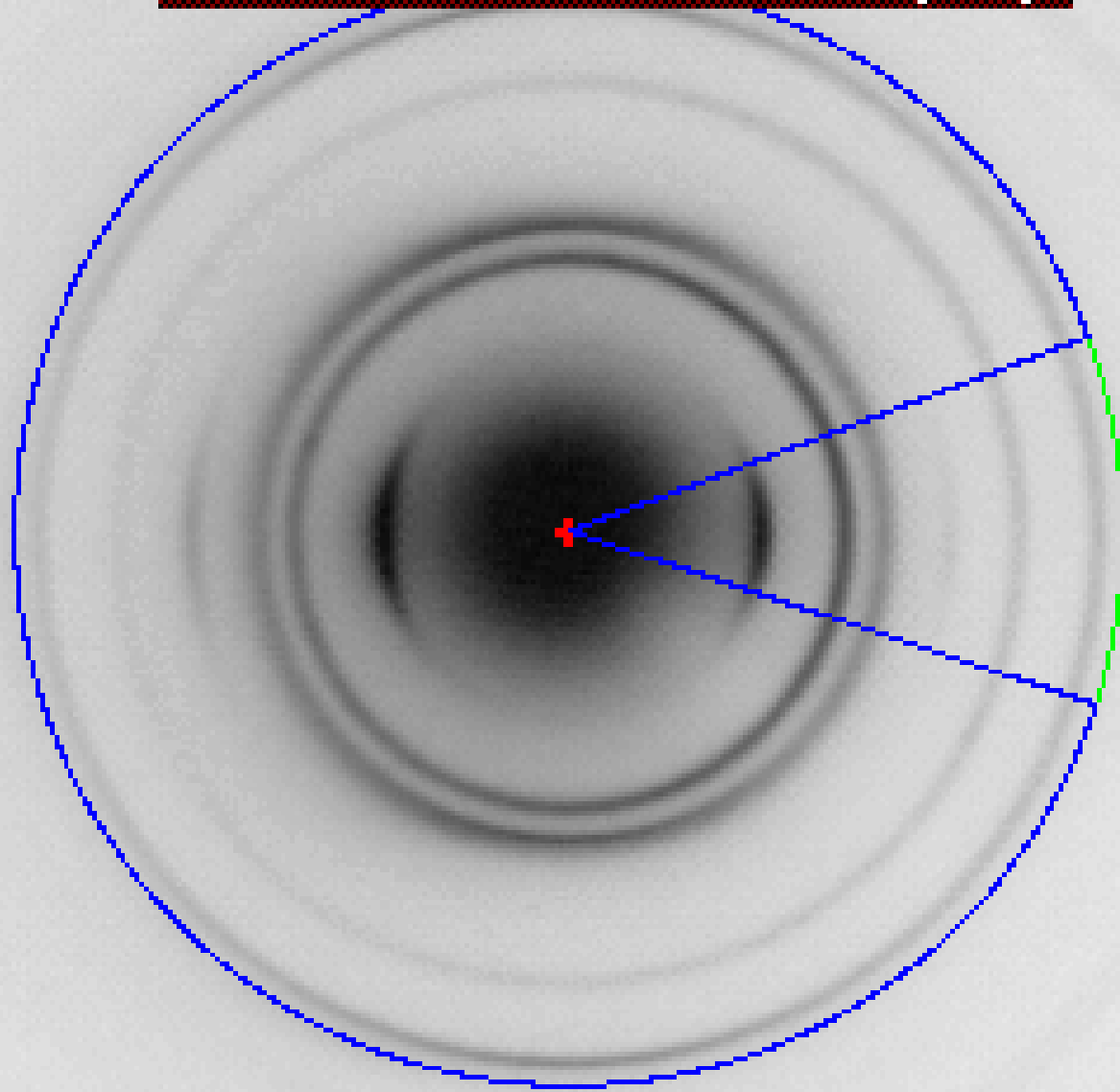


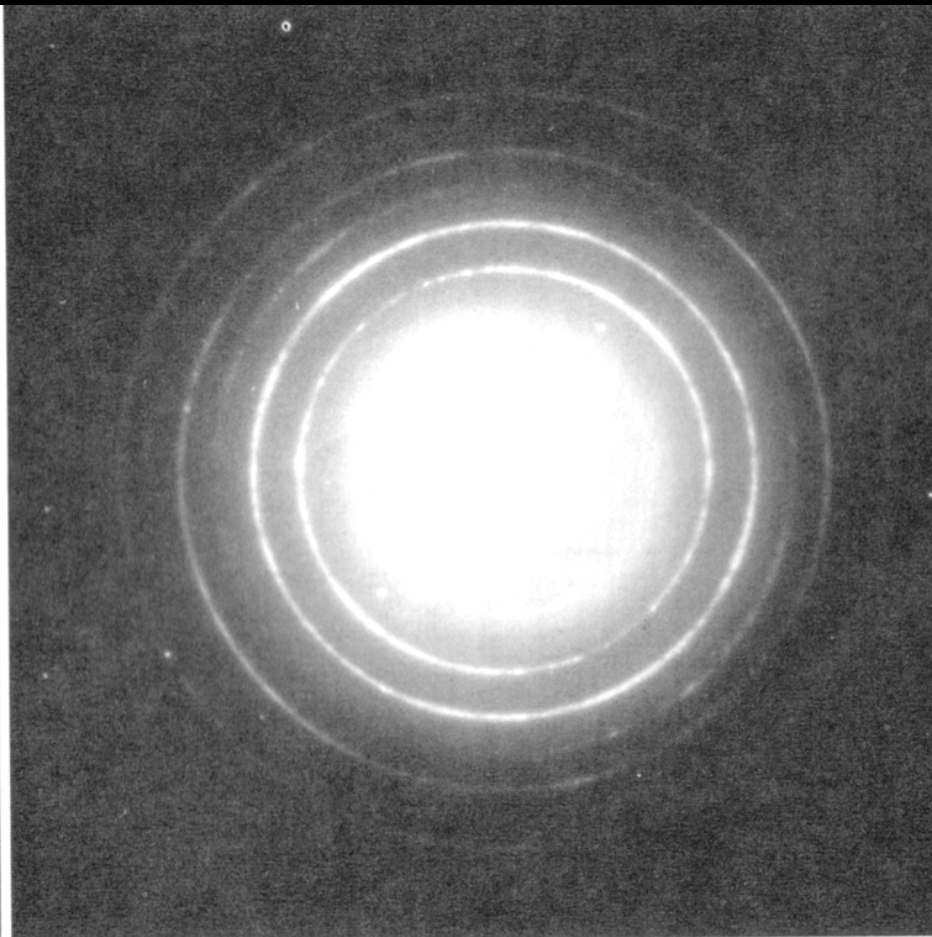
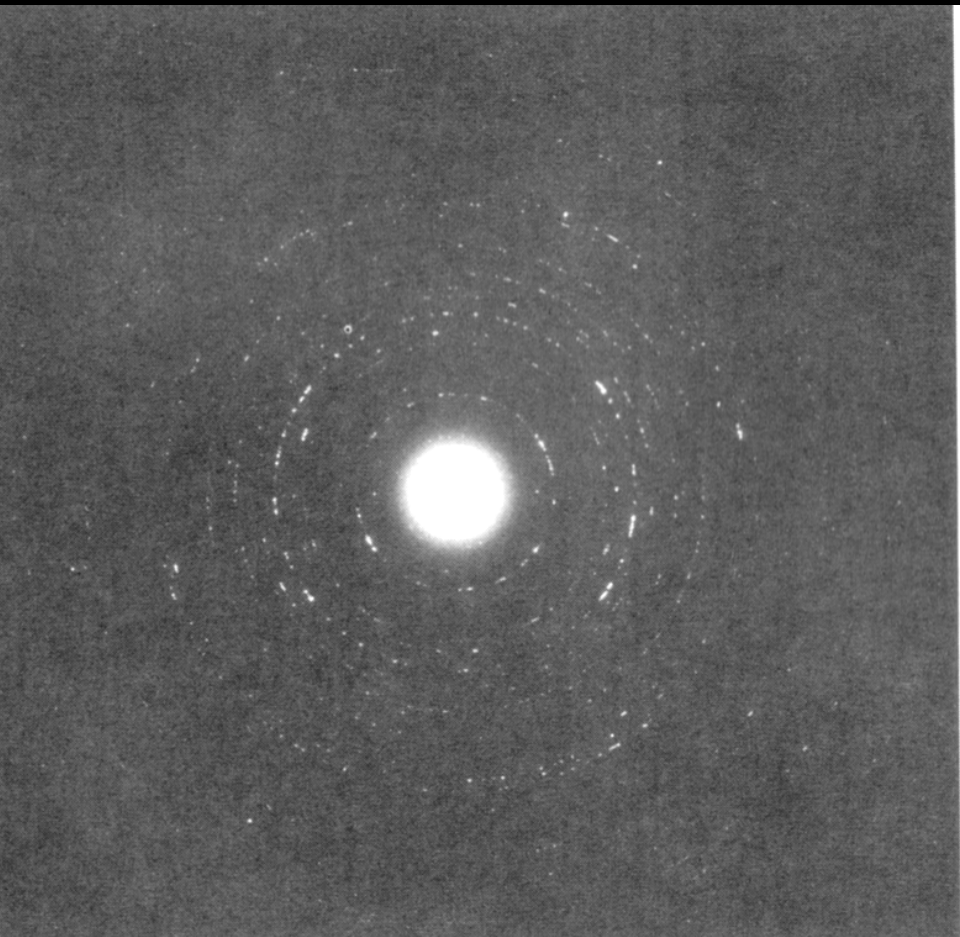
https://en.wikipedia.org/wiki/File:Crystal_orientation_and_diffraction.gif

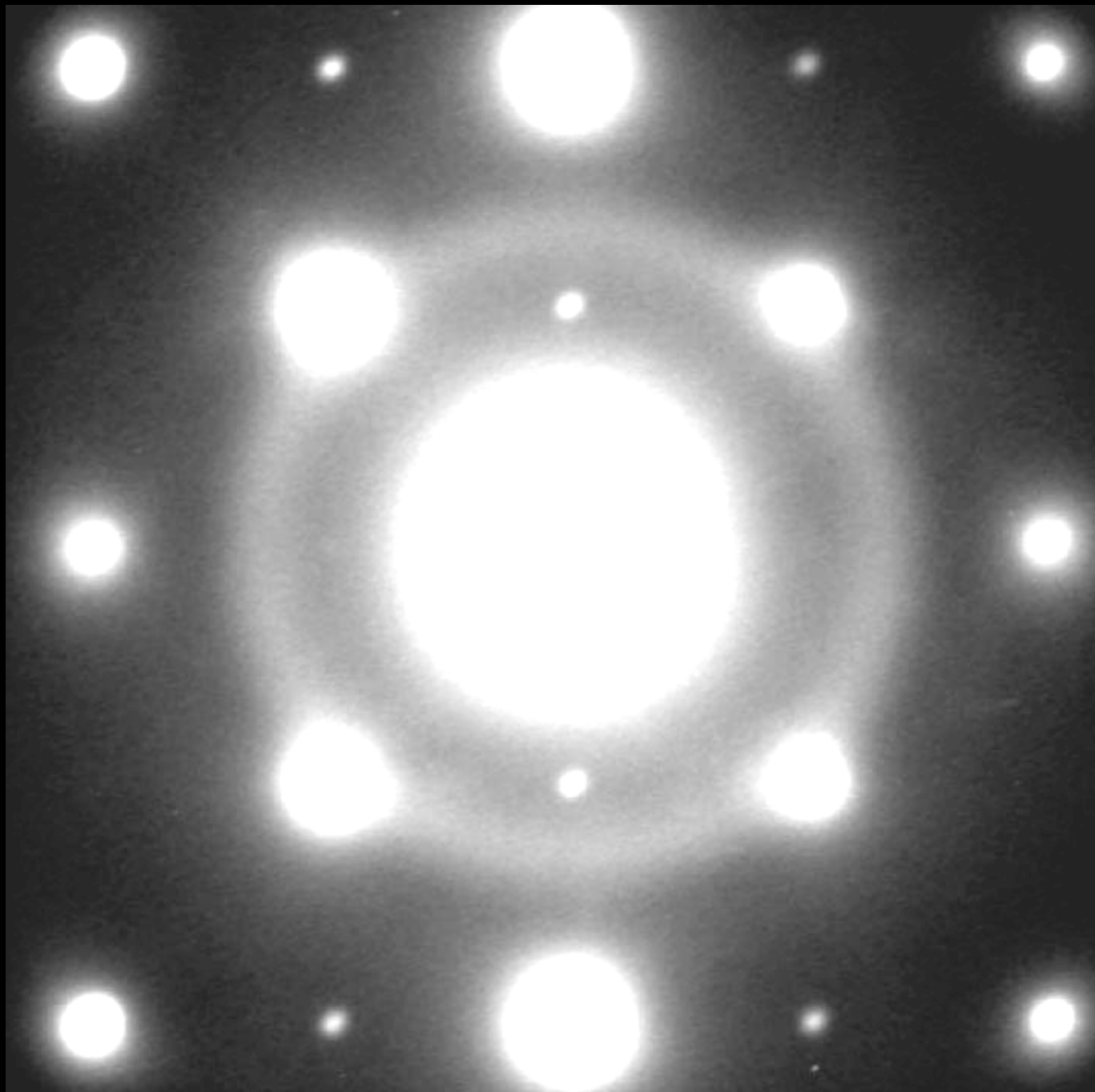


<https://upload.wikimedia.org/wikipedia/commons/thumb/a/ae/SpotToRingDiffraction.gif>

735AC.TIF - 640x488x8 (2:1)

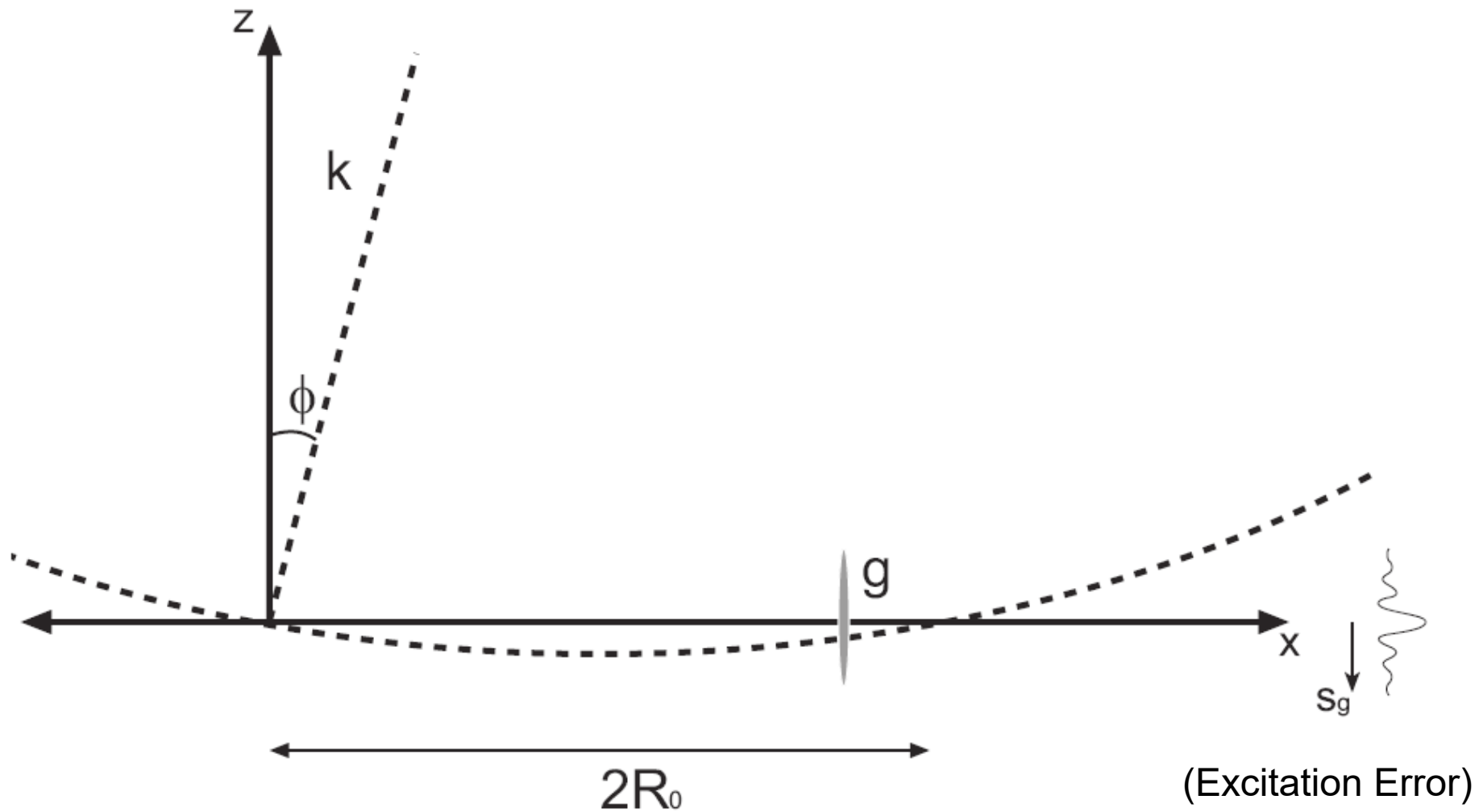




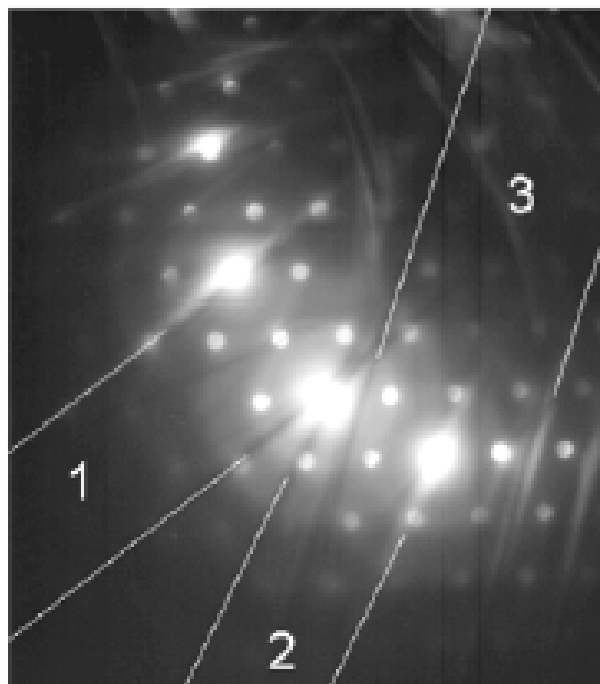
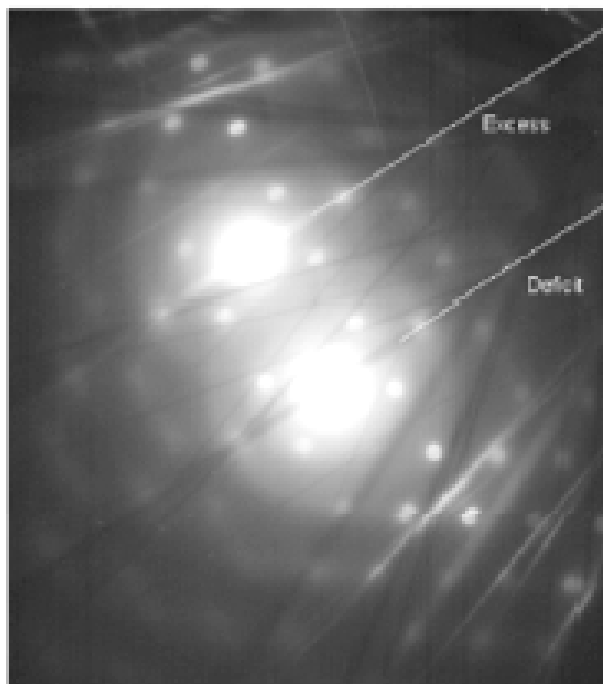
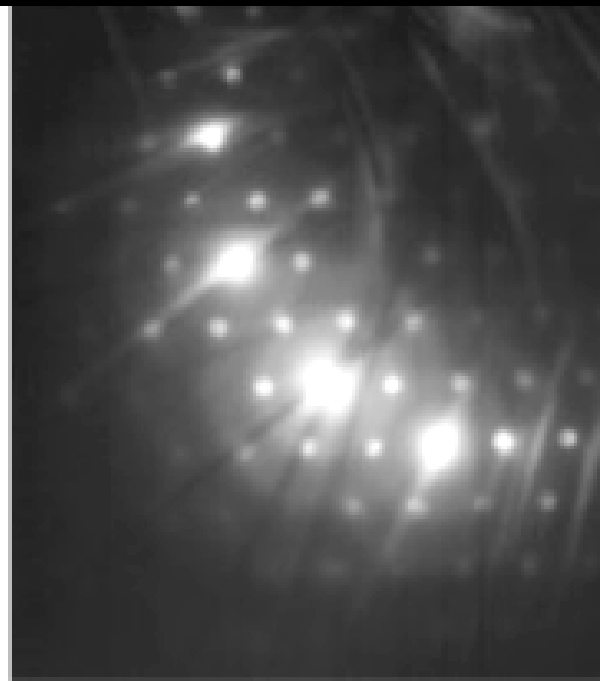
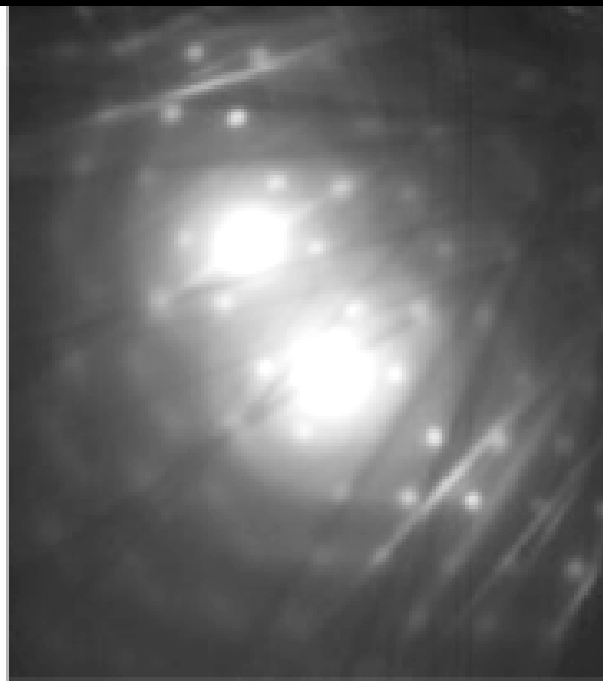


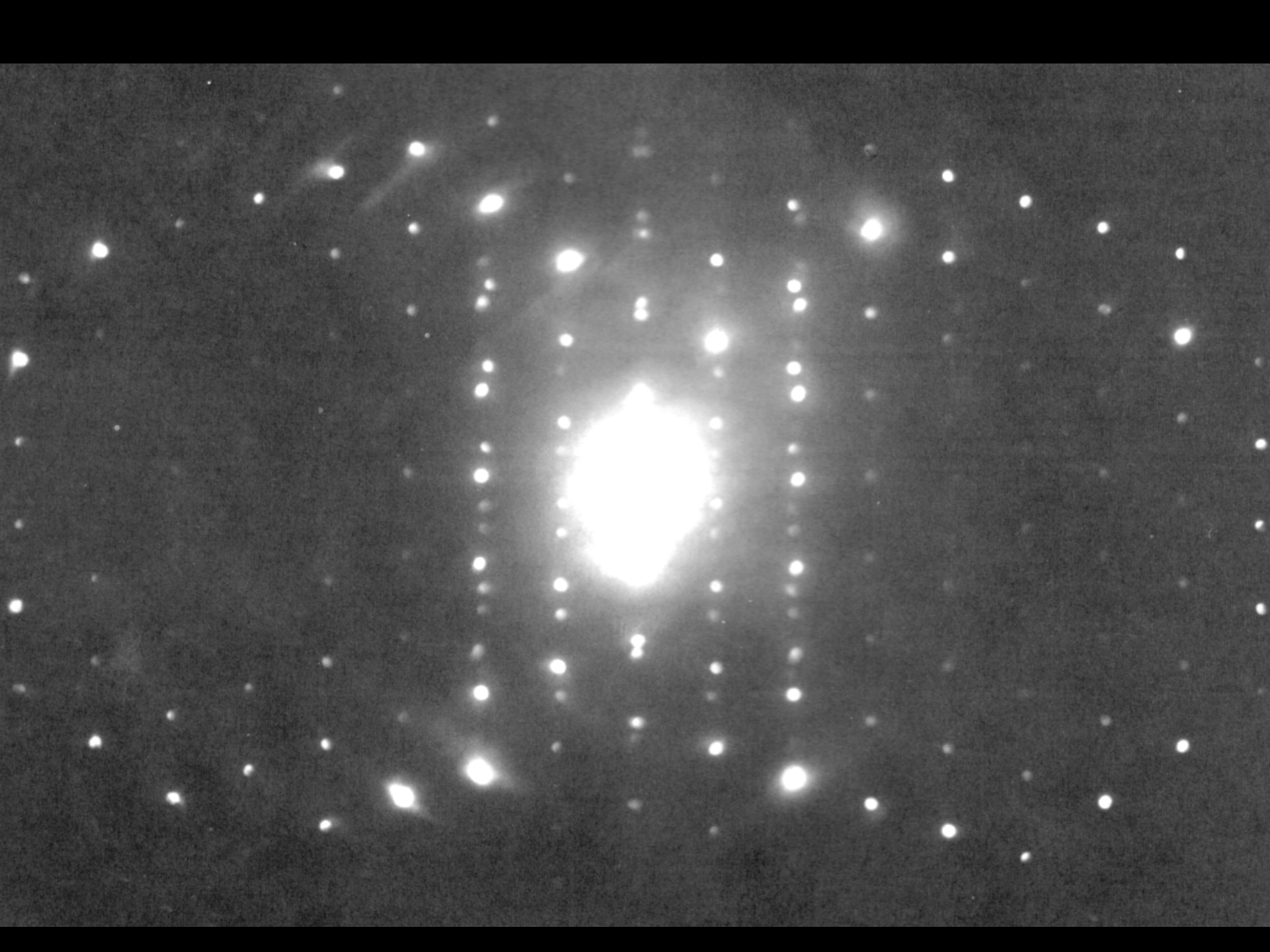


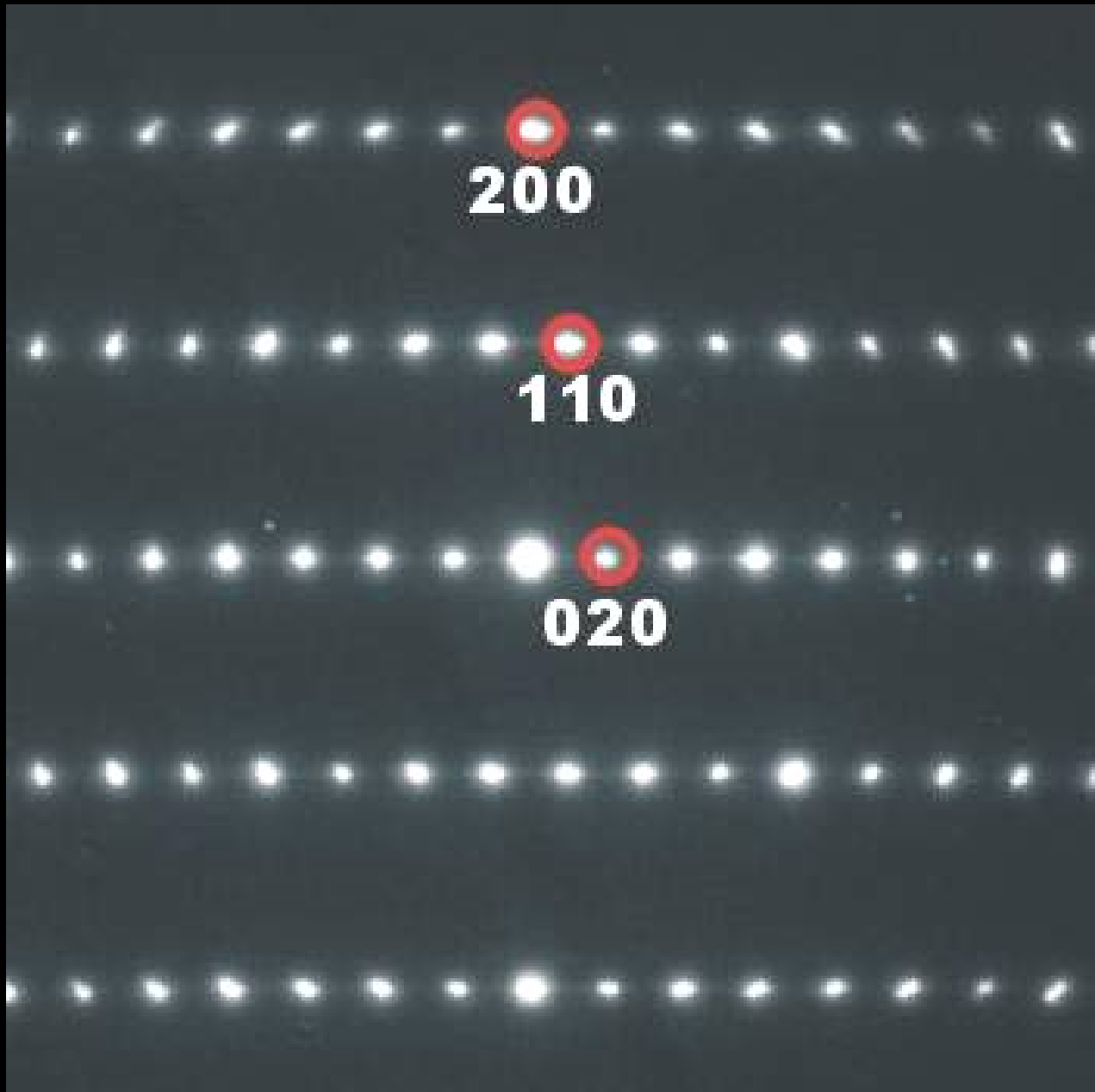
Tilted Ewald Sphere



ab





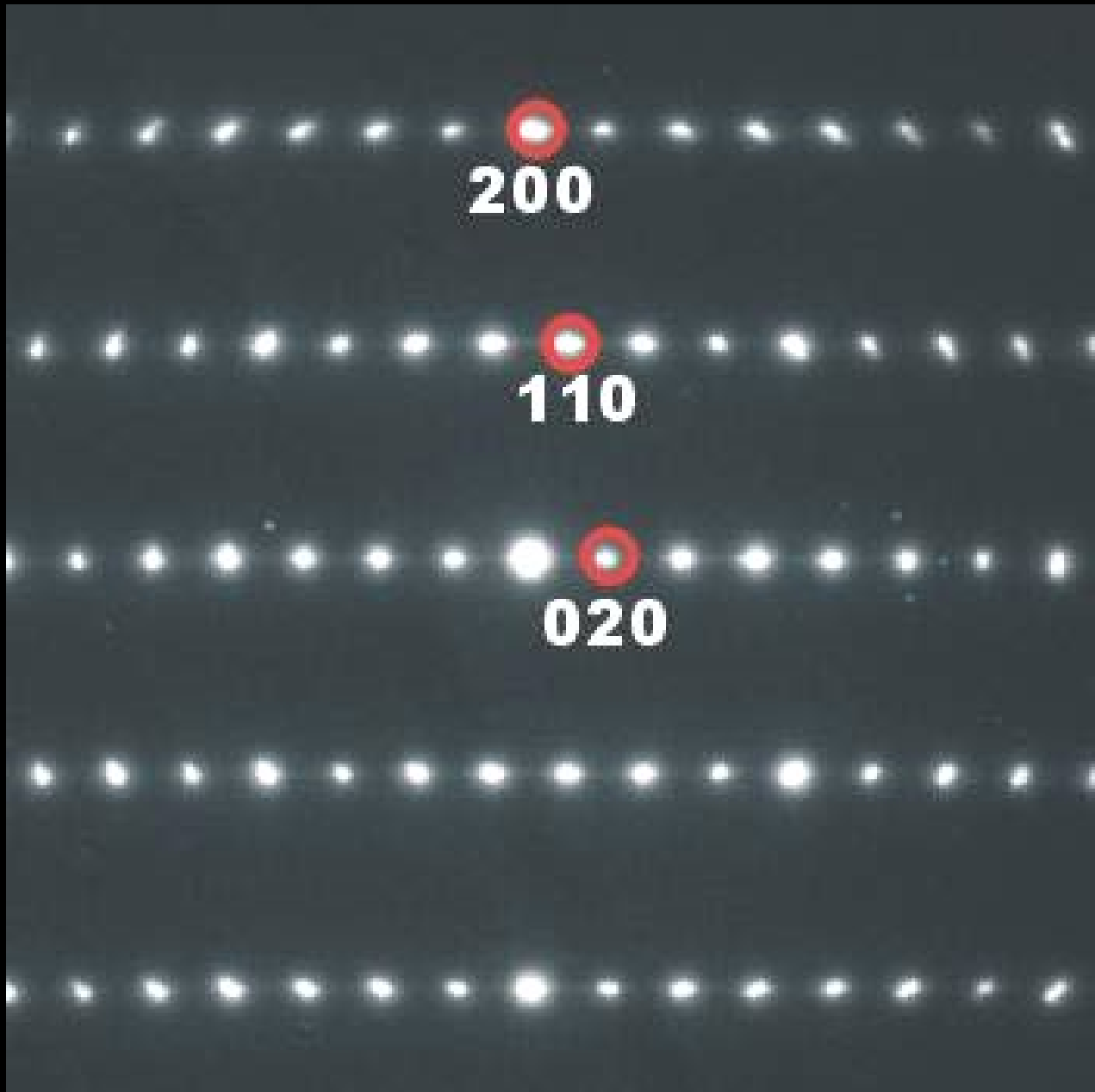


Structure Factor

- Example: Body-Centered Cubic
- Atoms at $0,0,0$ & $\frac{1}{2}, \frac{1}{2}, \frac{1}{2}$
- Add two $\exp(2\pi i \cdot \mathbf{g} \cdot \mathbf{r})$ terms
- $\mathbf{g} = h\mathbf{A} + k\mathbf{B} + l\mathbf{C}$;
- Result is $1 + \exp(2\pi i [h/2 + k/2 + l/2])$
- $h+k+l$ is even – gives 2 ; odd gives 0
- Hence forbidden spots

Forbidden Spots

- Three cases
 - 1) Use larger cell because of symmetry
 - 2) Glide plane or screw axes, on forbidden if electron beam is symmetric
 - 3) Accidental, for instance Si (222)

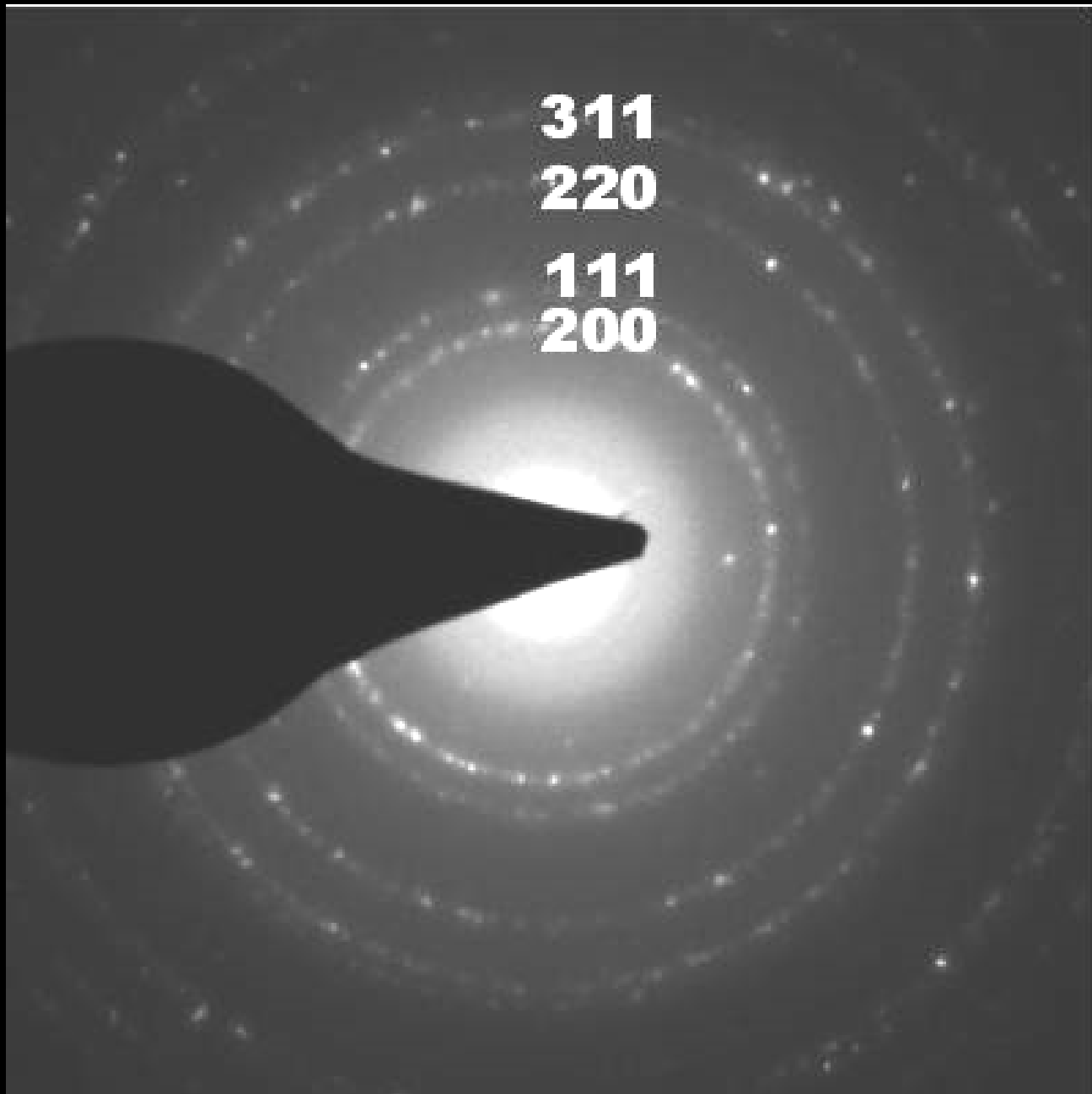


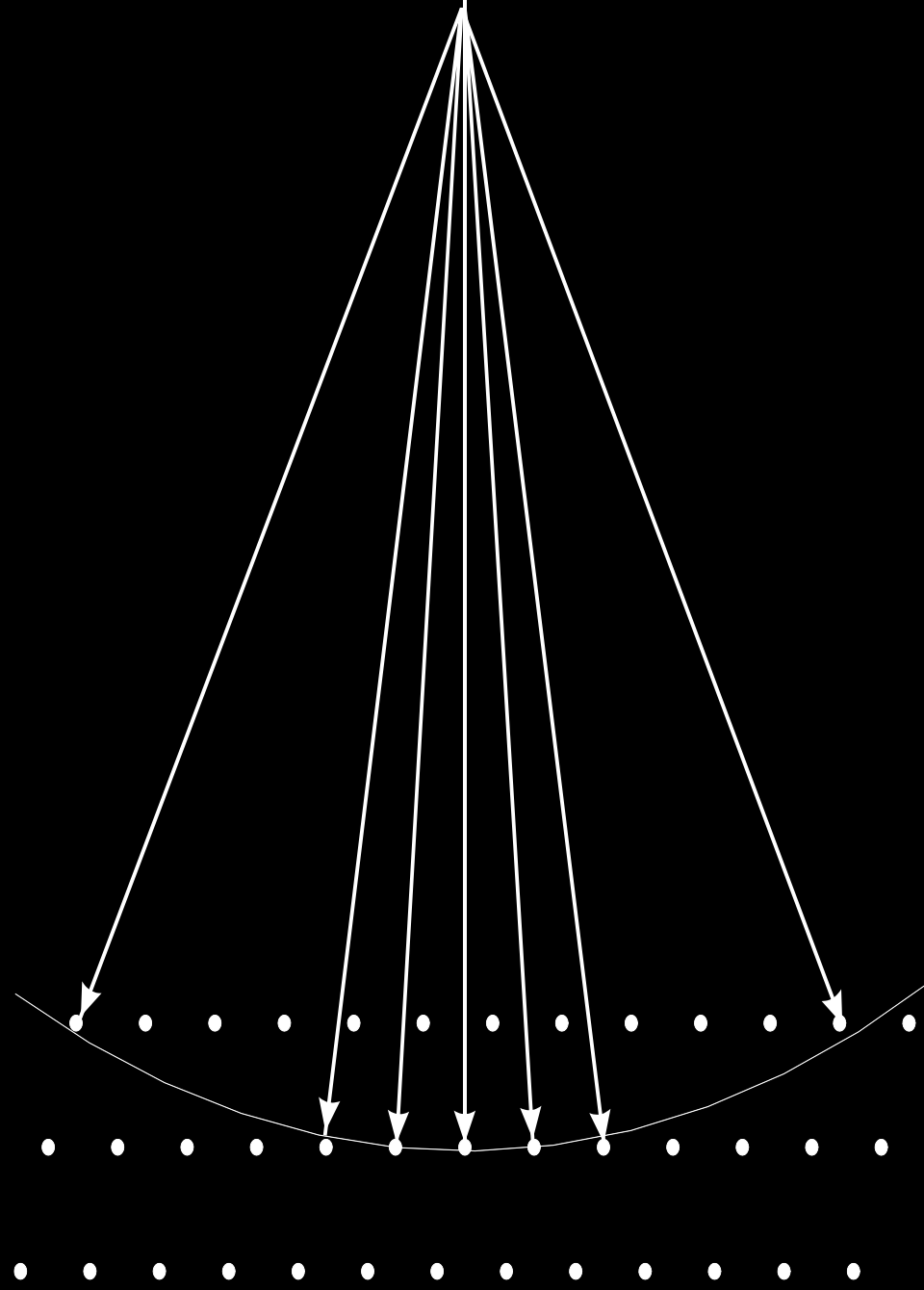
311

220

111

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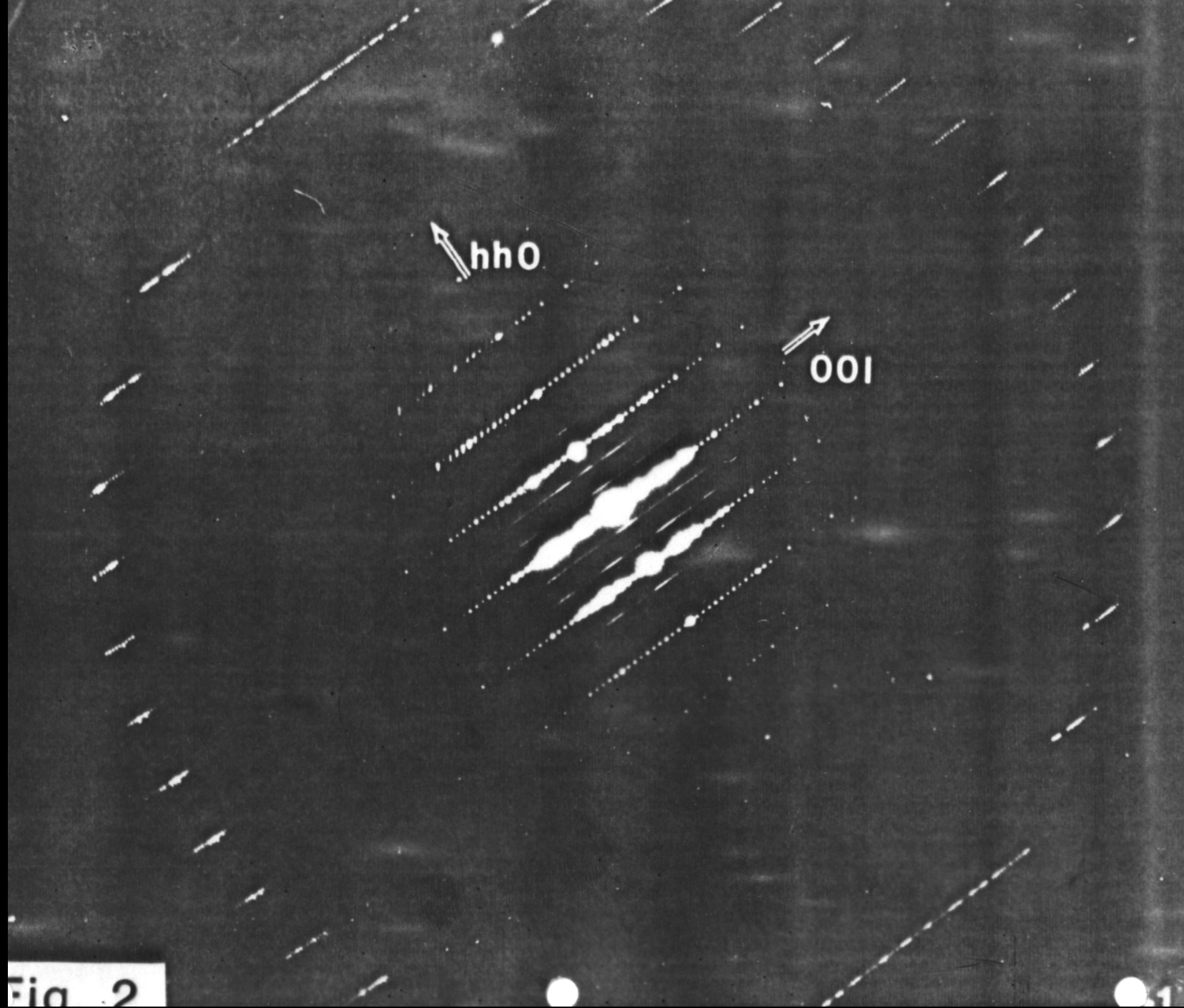
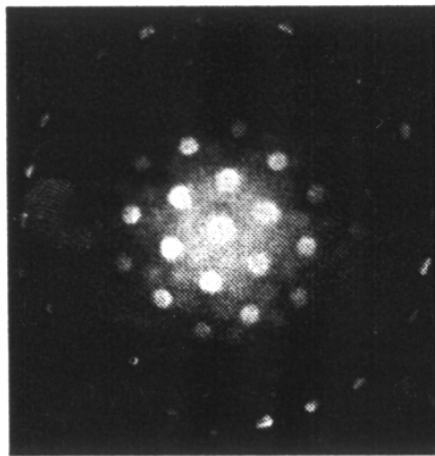
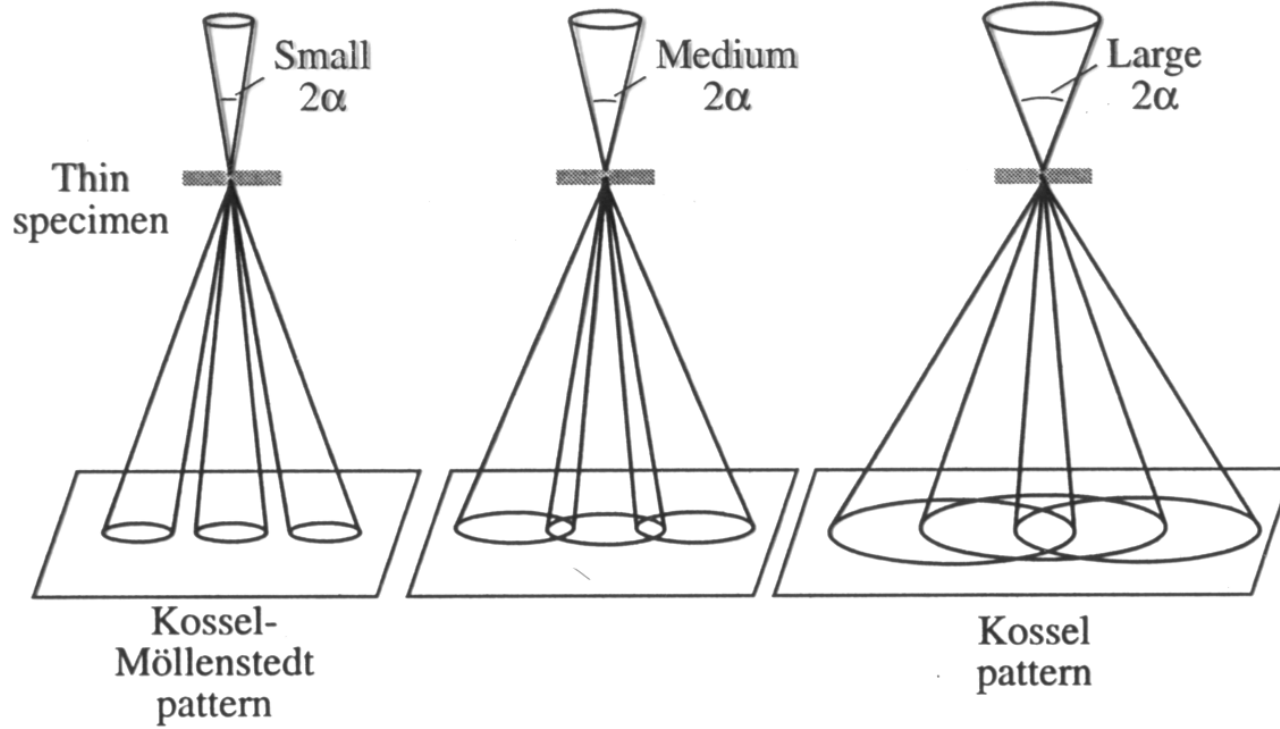
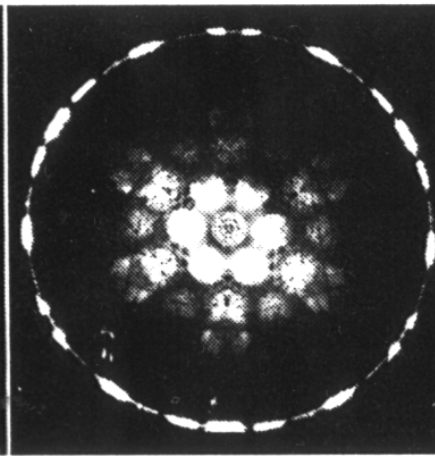


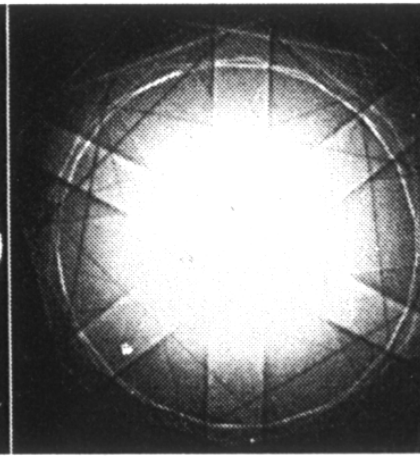
Fig. 2



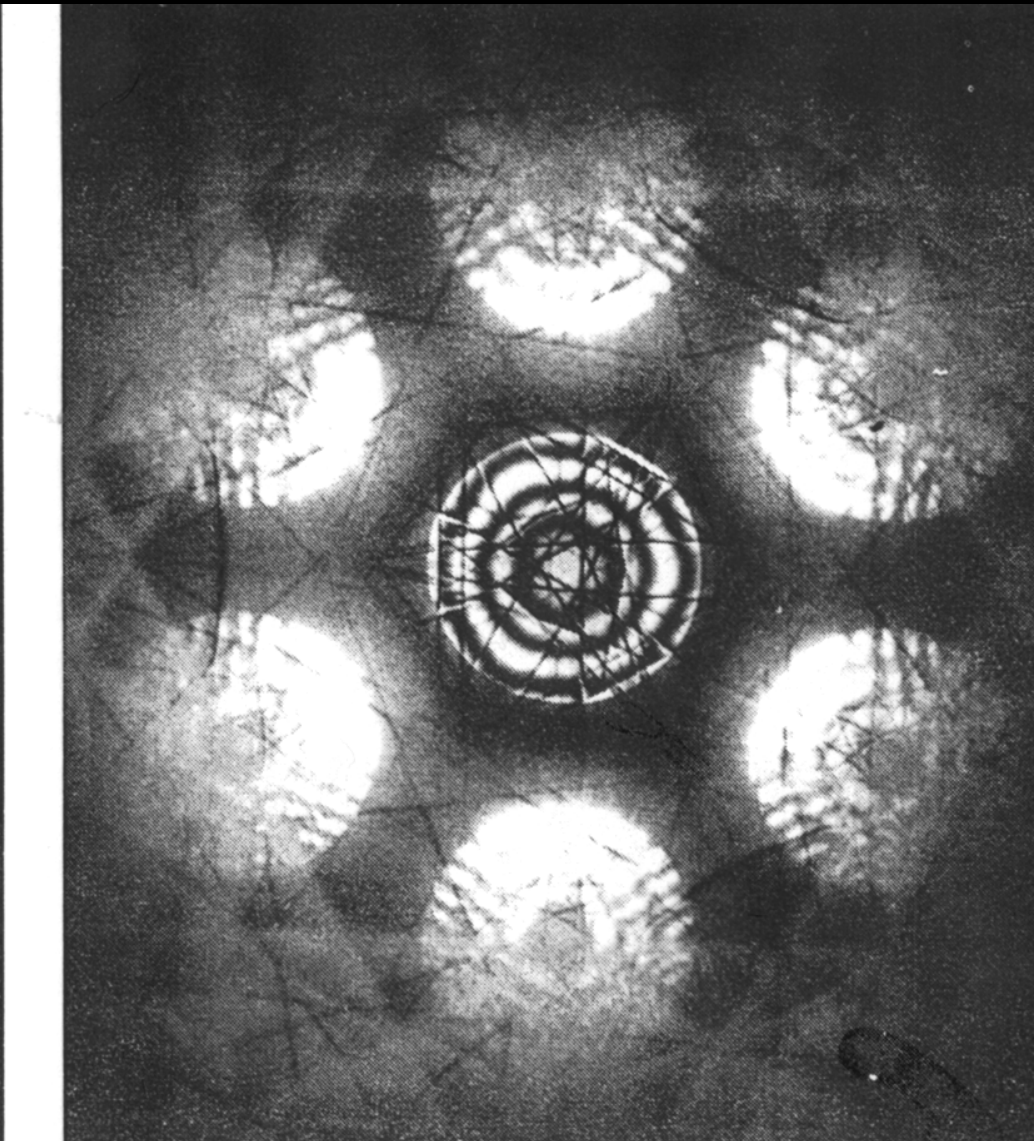
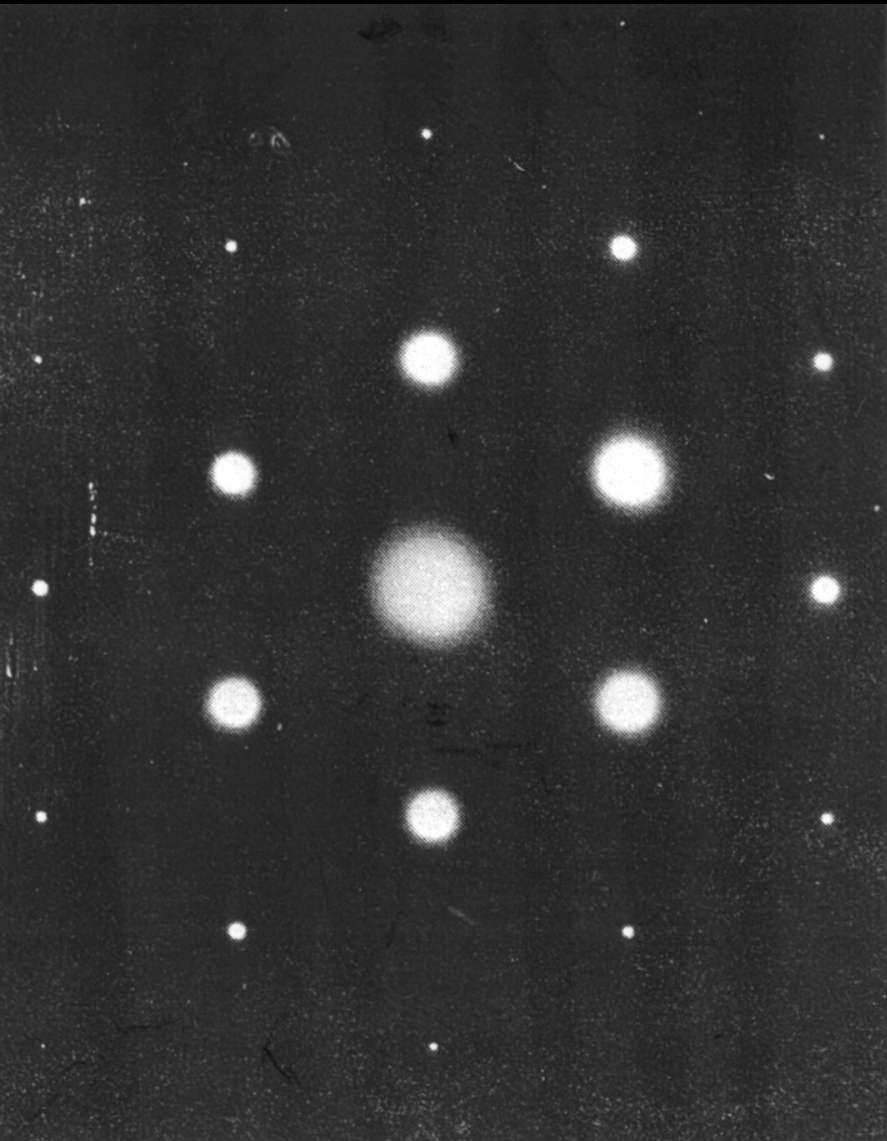
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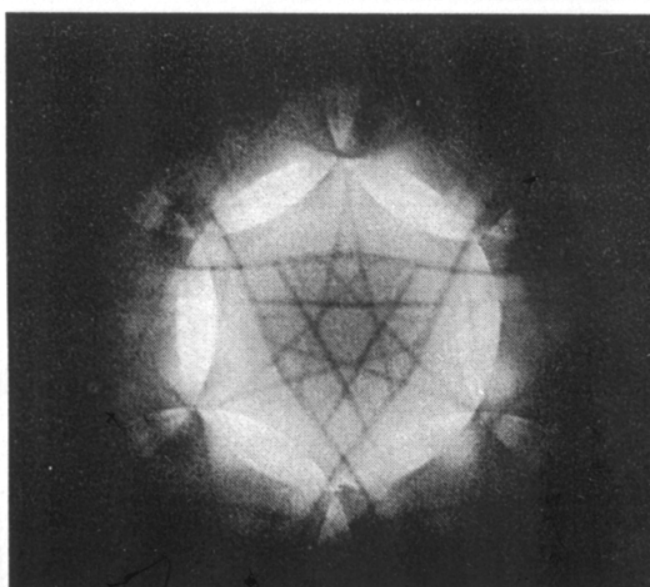
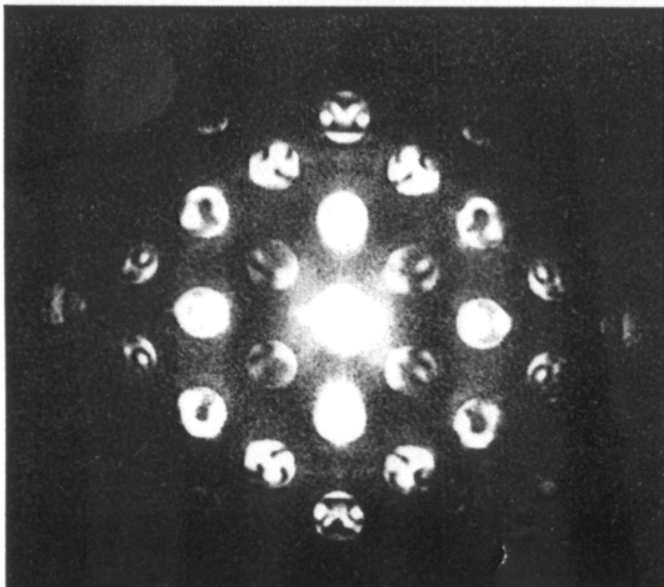
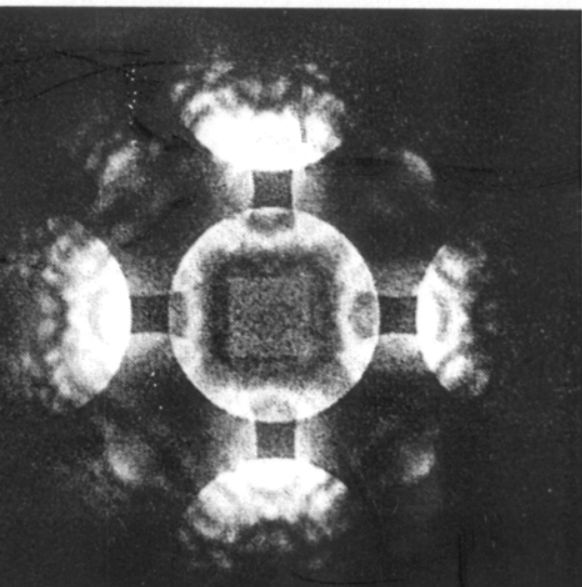
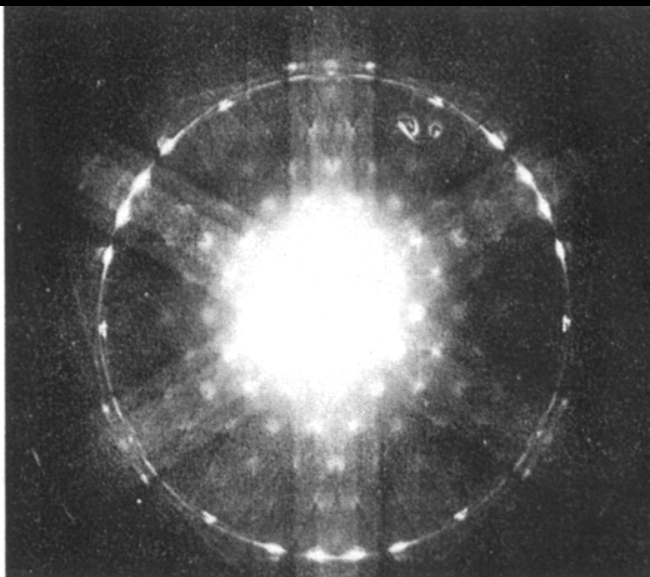
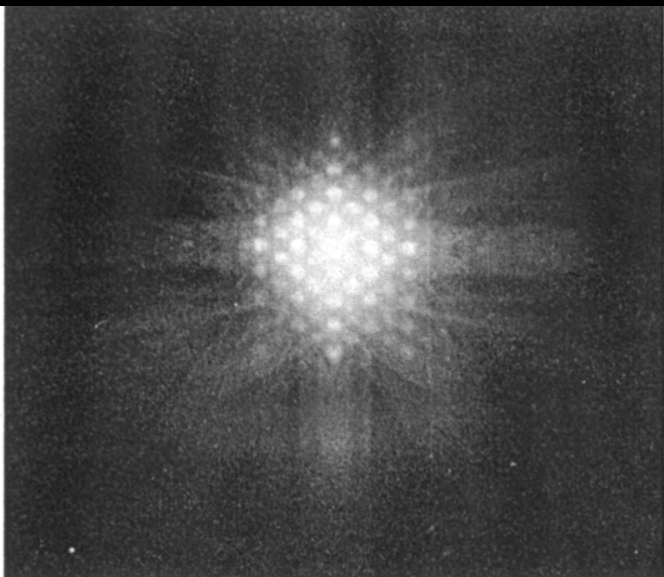
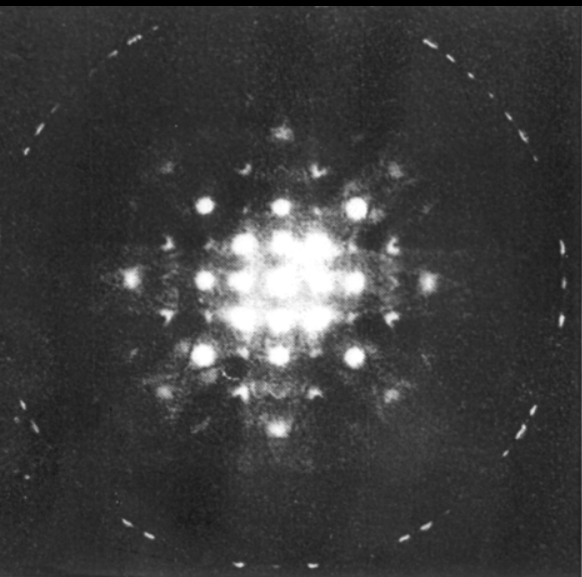


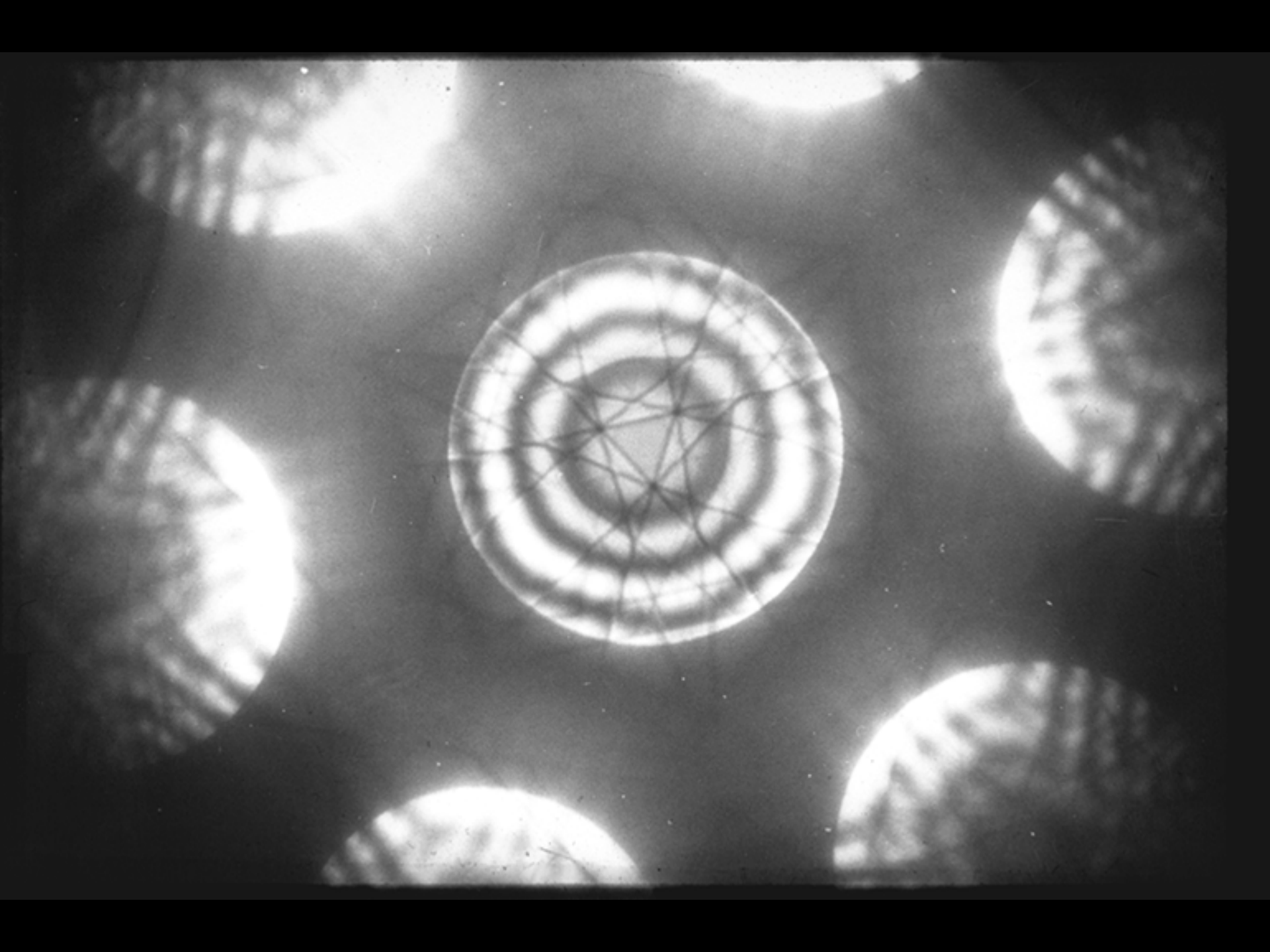
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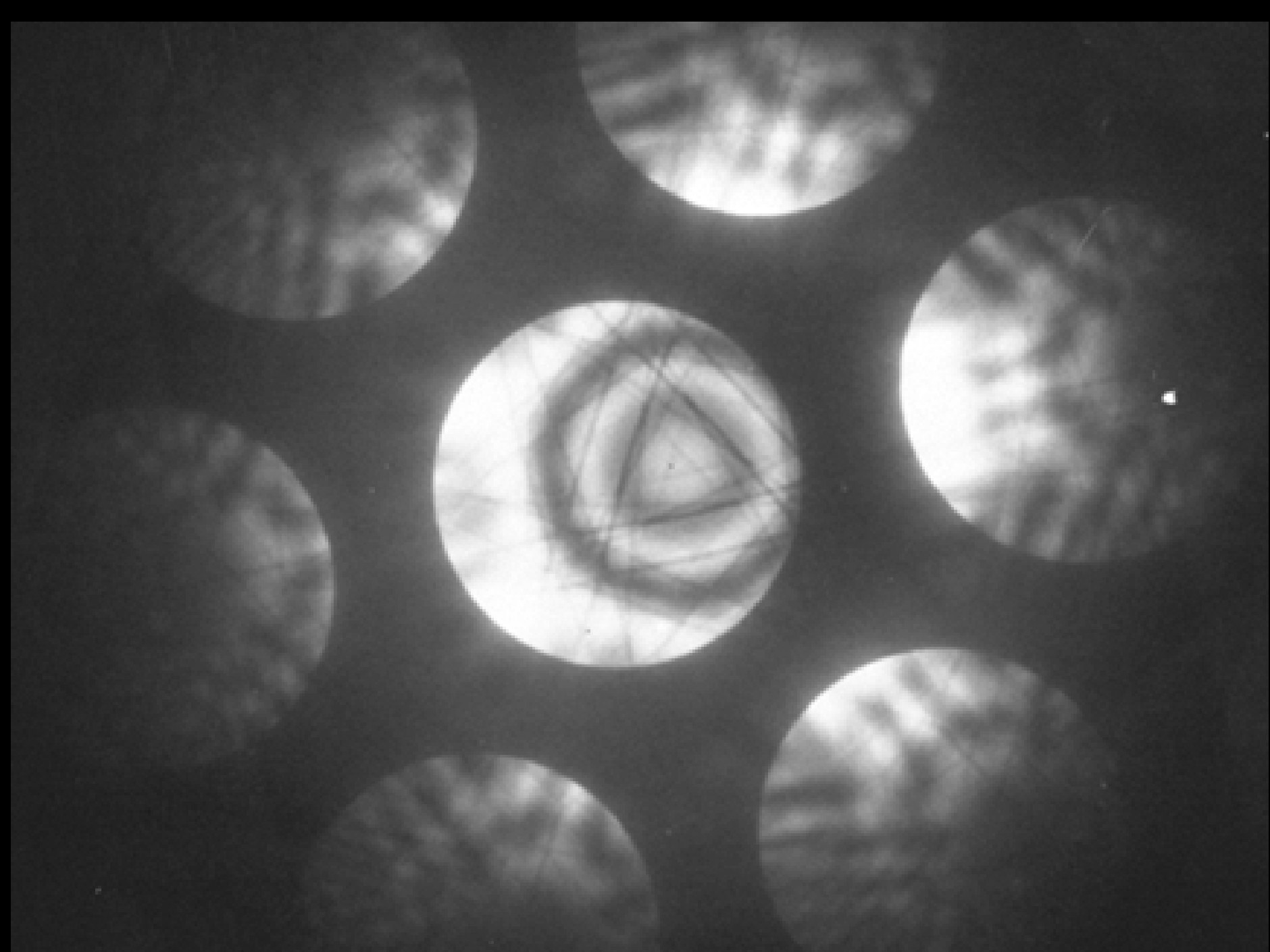


F



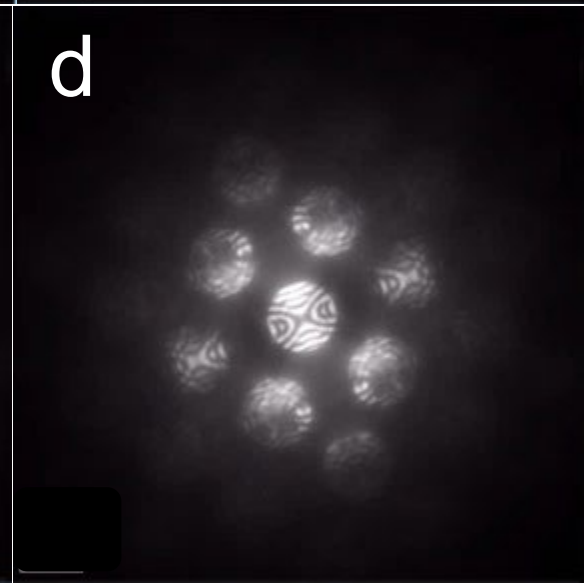
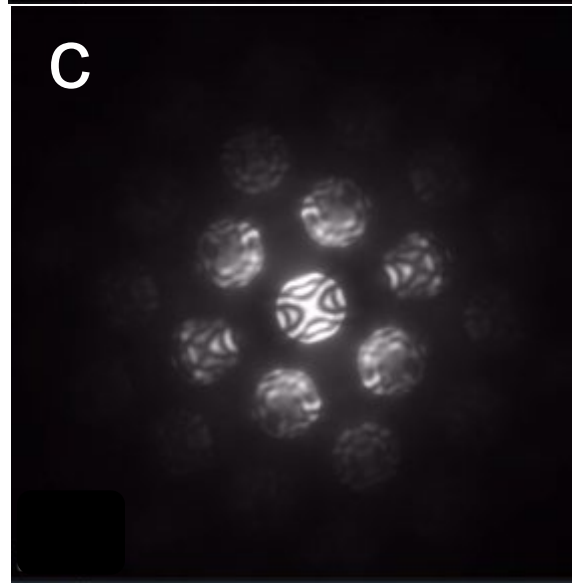
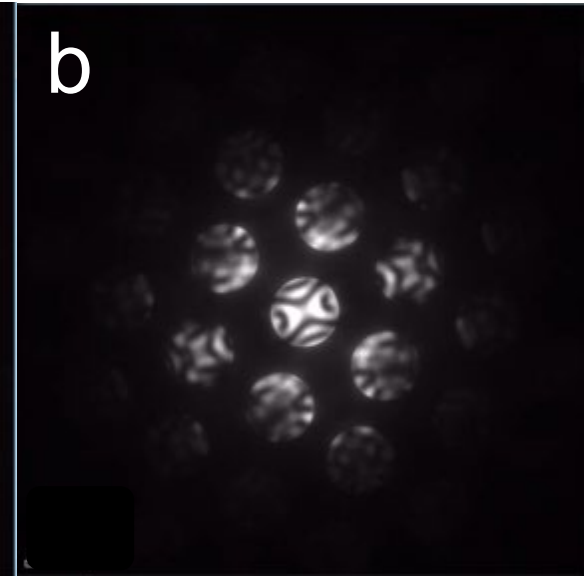
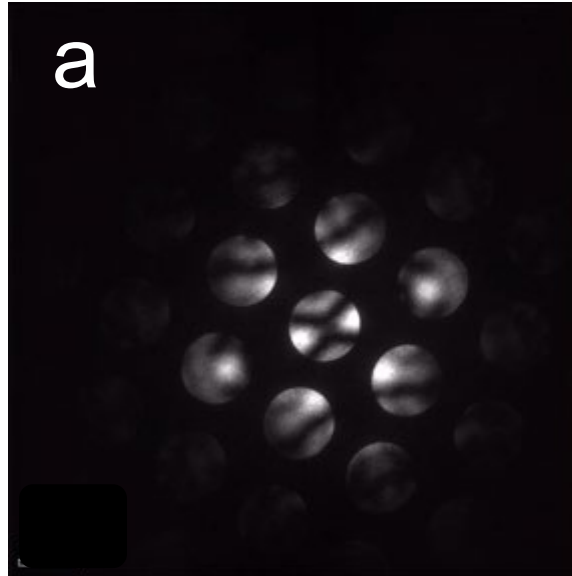






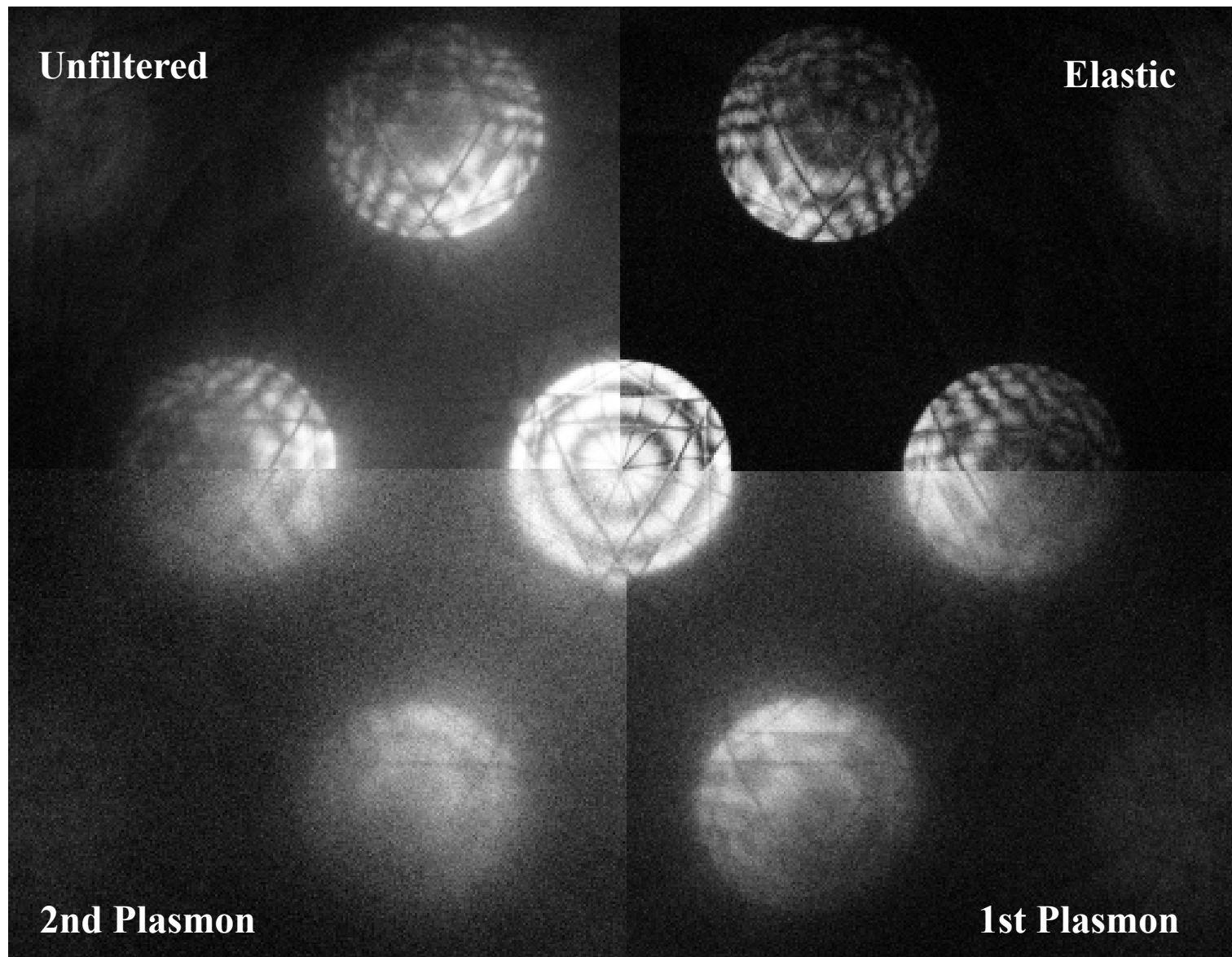
Silicon
{110}

Structure in CBED patterns is
Dependant upon
Extinction/Thickness

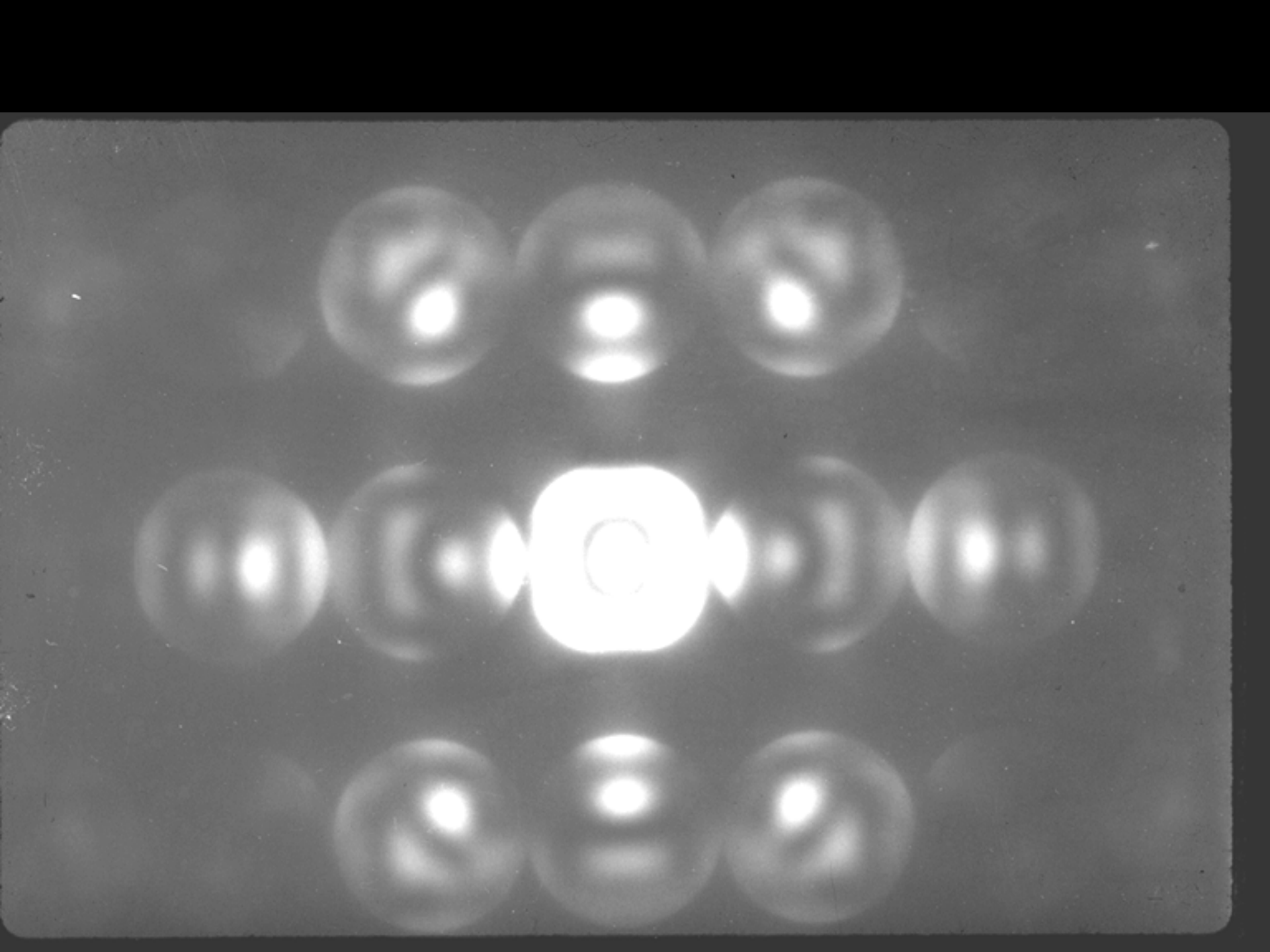


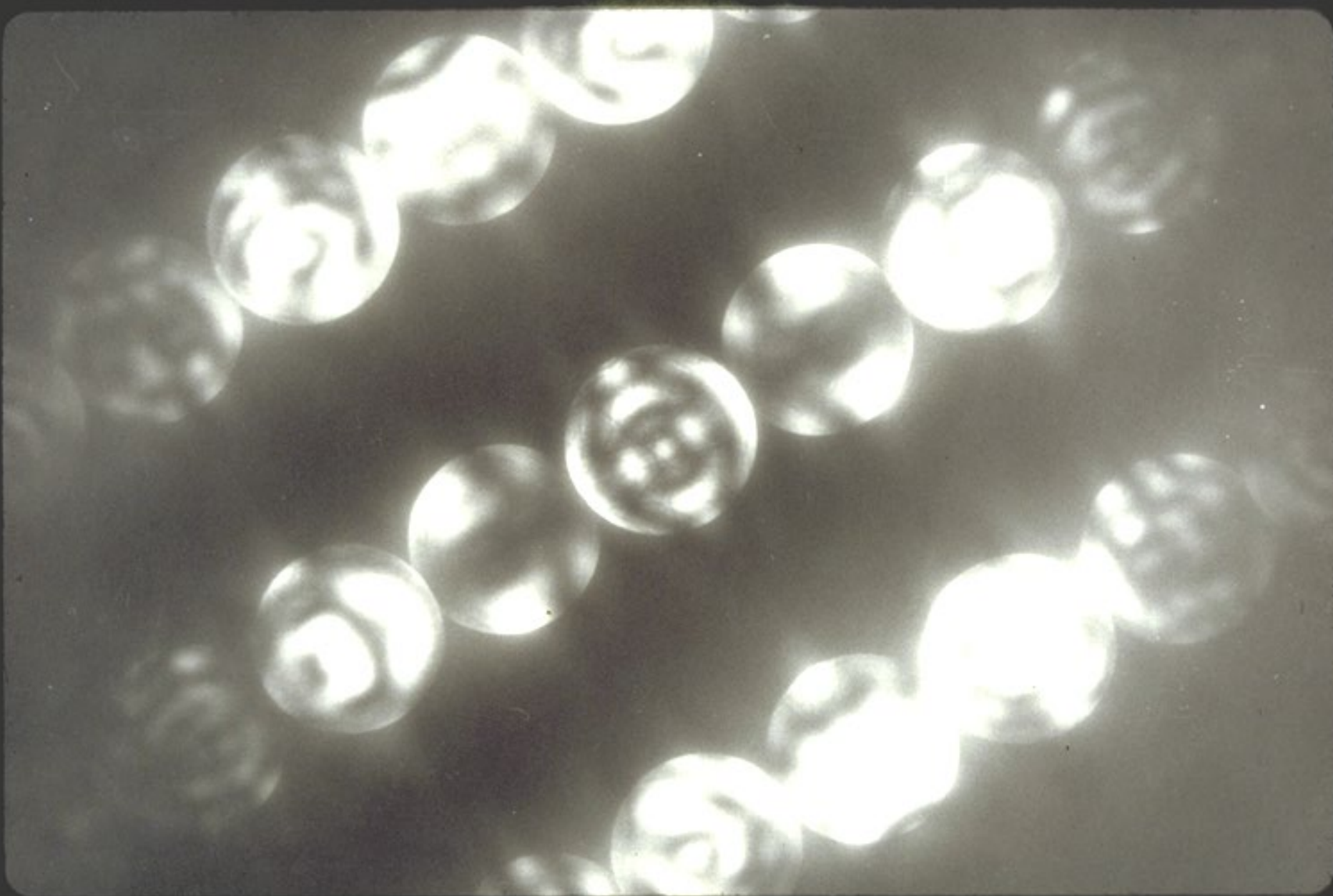
Curtesy Nestor Zaluzec, ANL

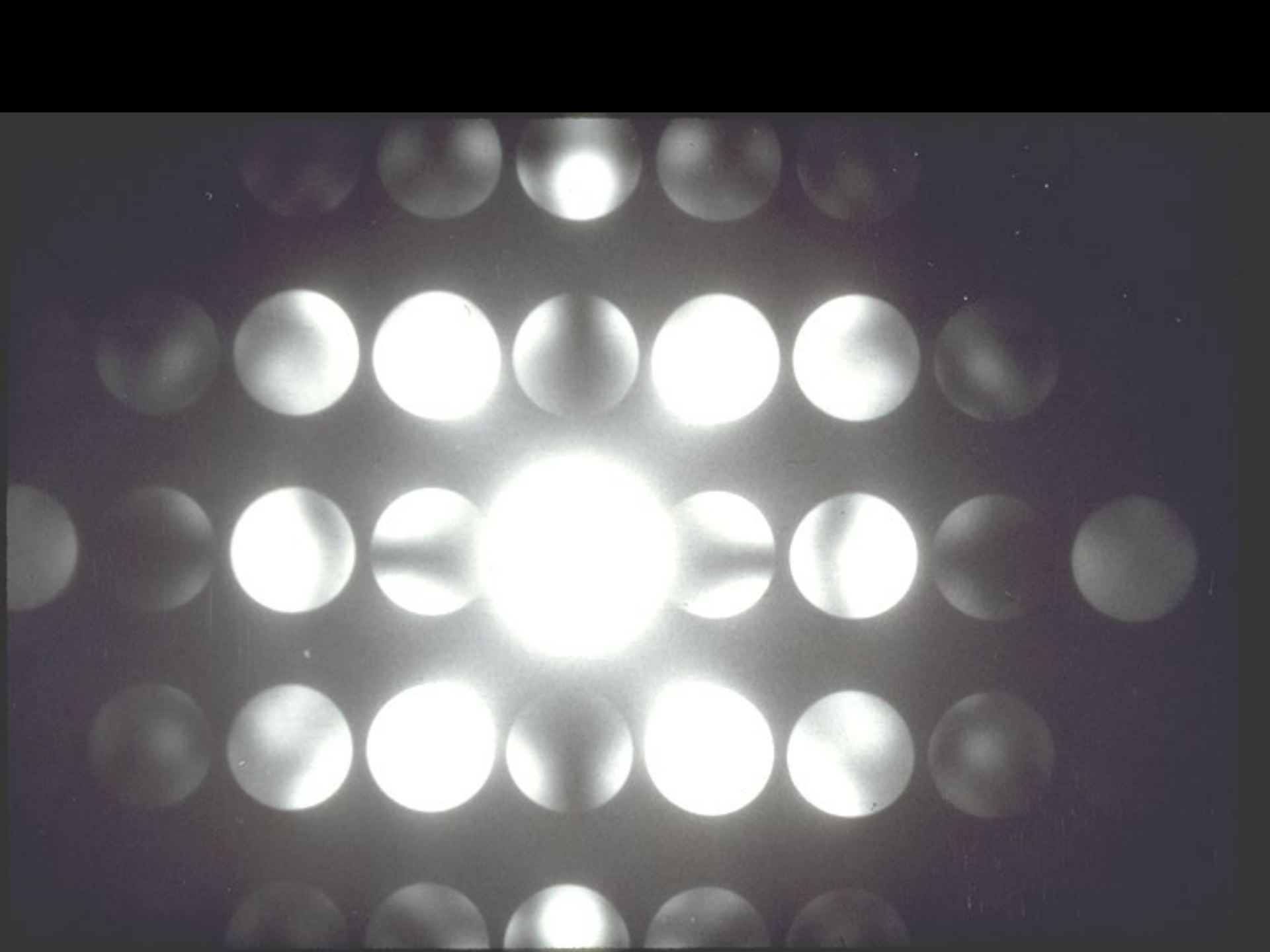
Silicon 111 ZAP- Energy Filtered



Curtesy Nestor Zaluzec, ANL



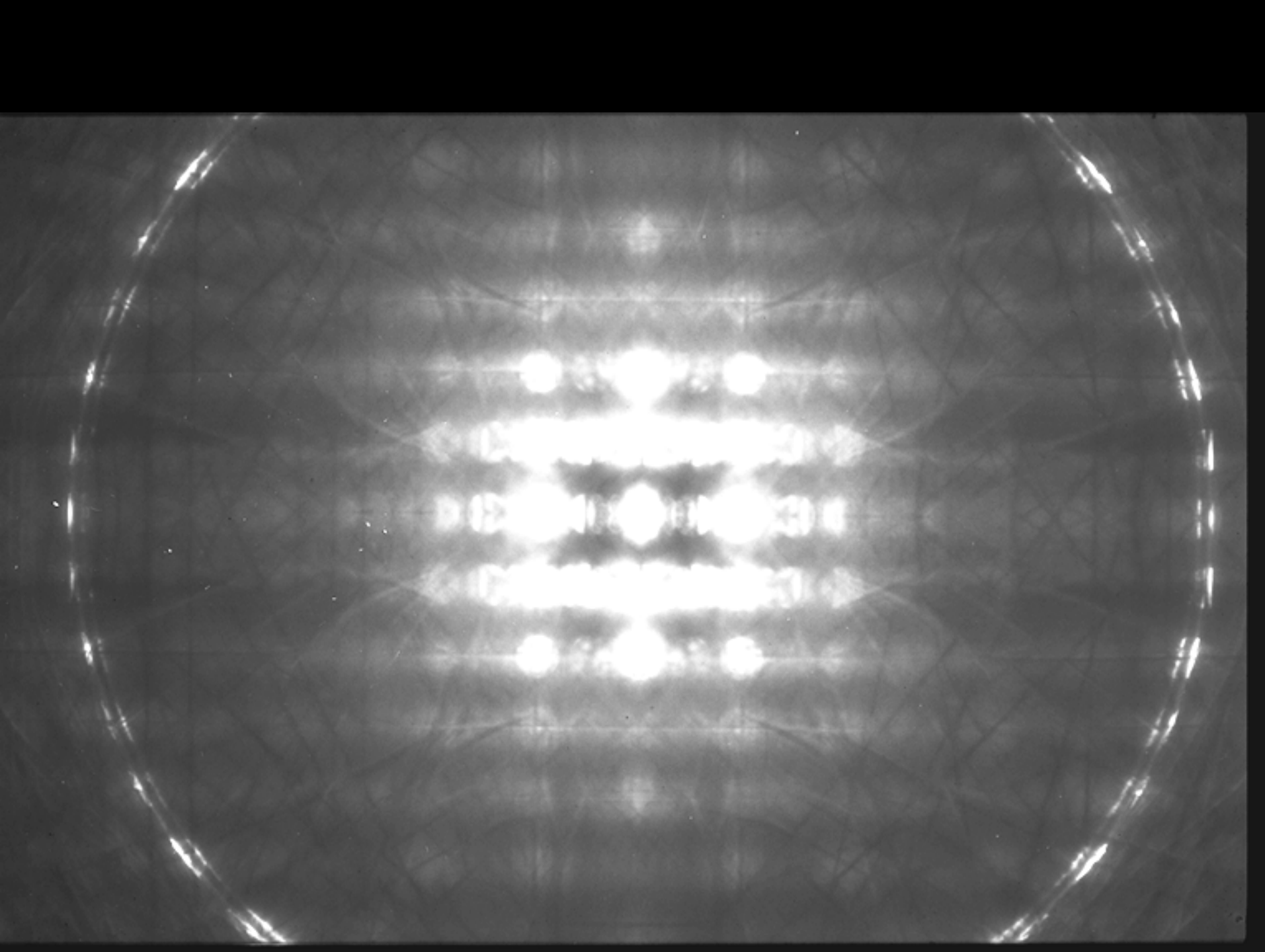


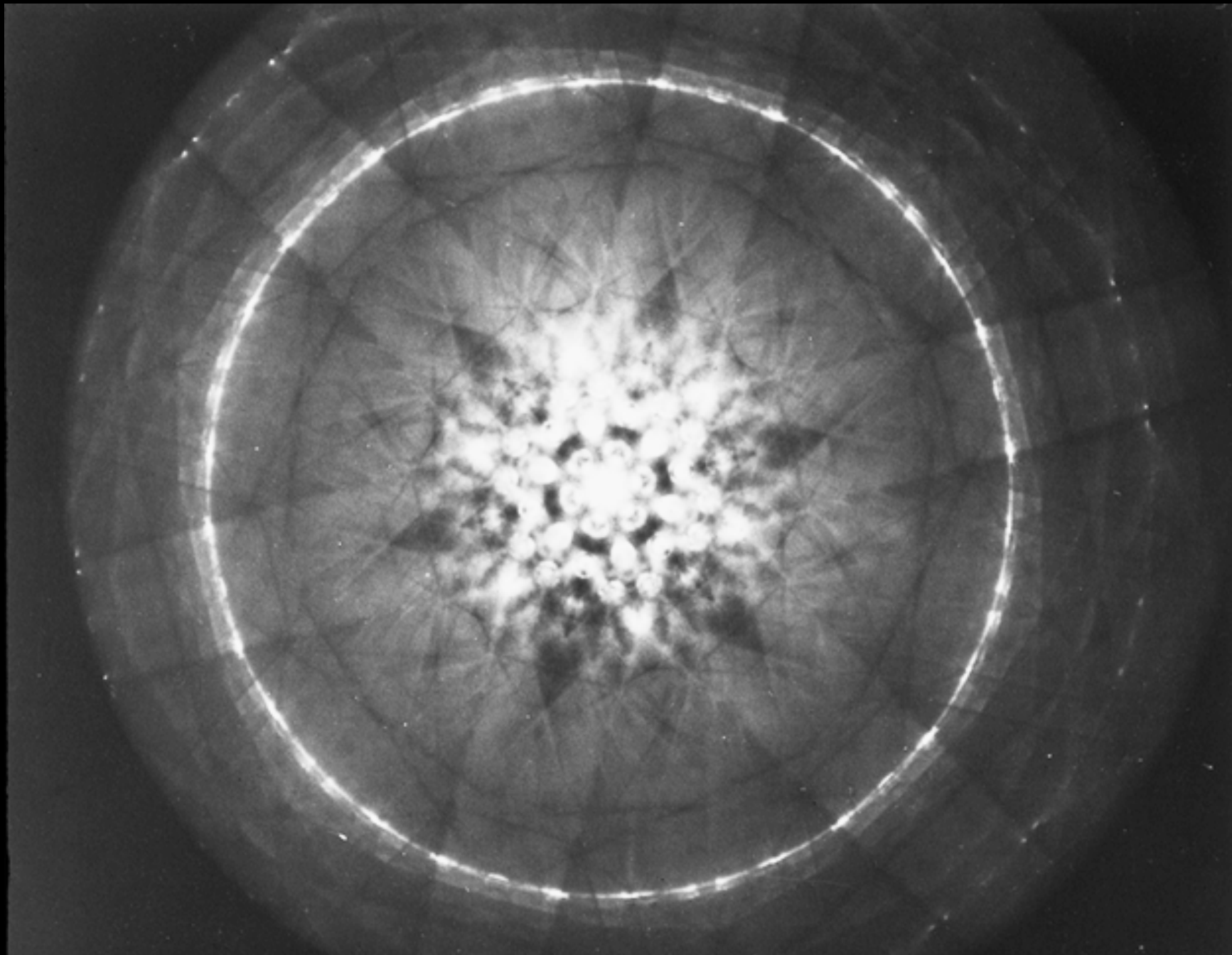


$10\bar{9}0$ \rightarrow

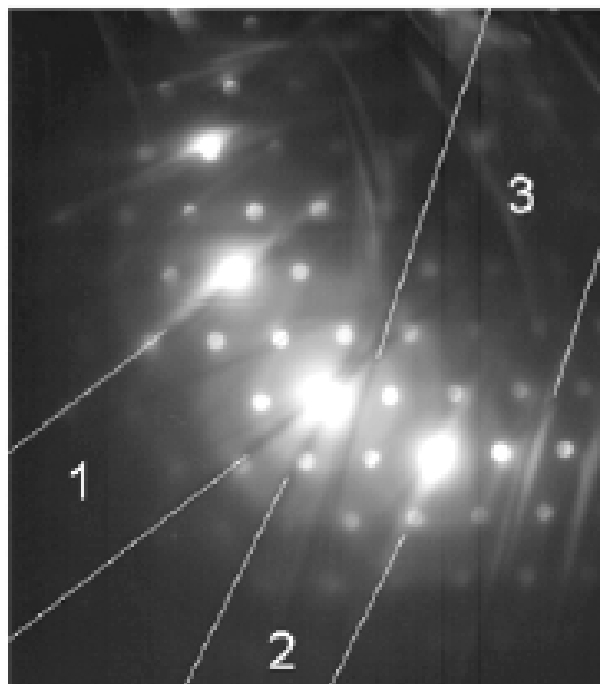
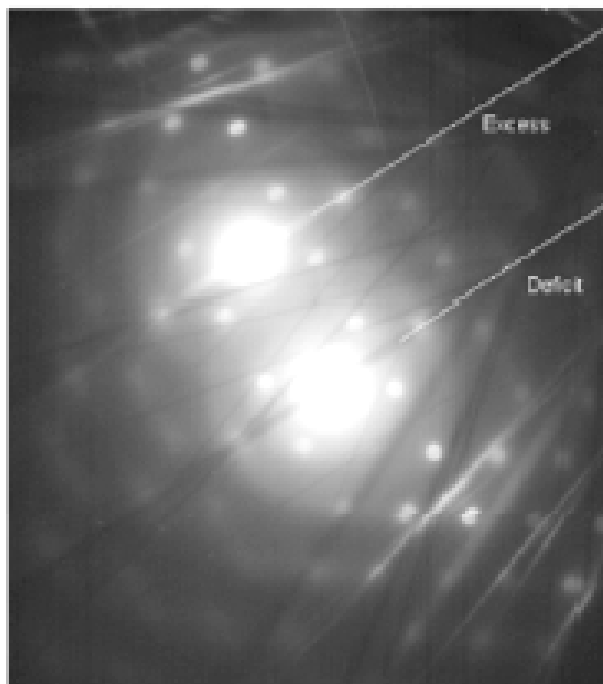
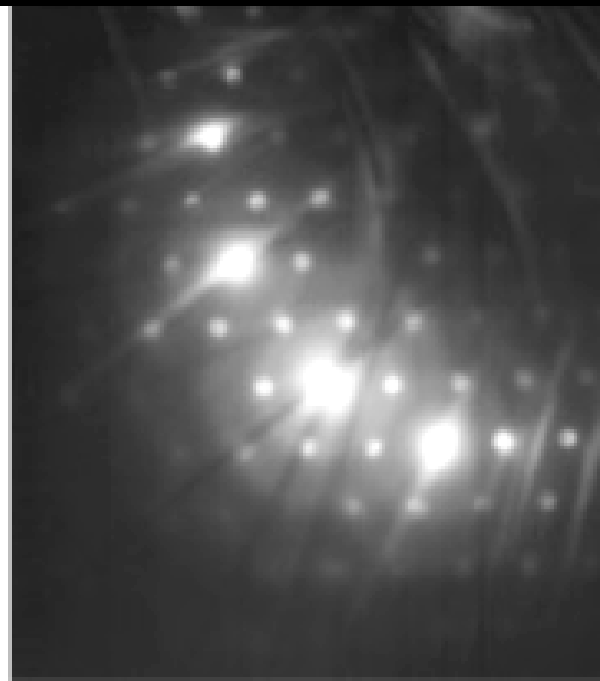
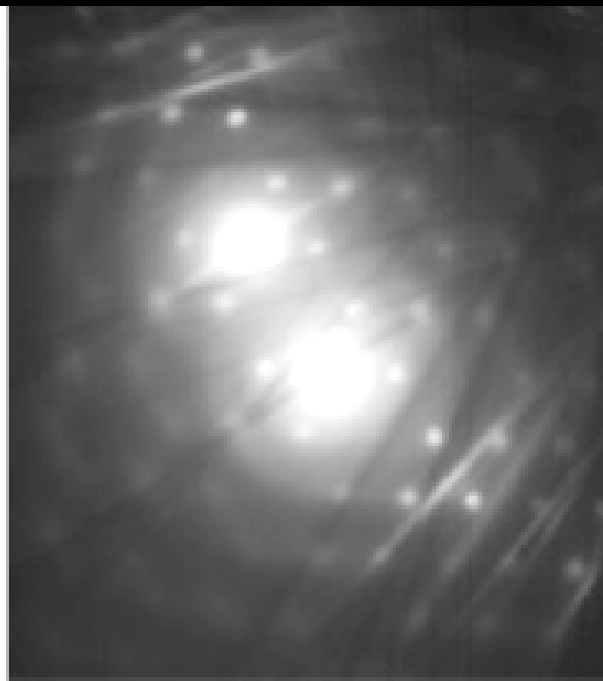


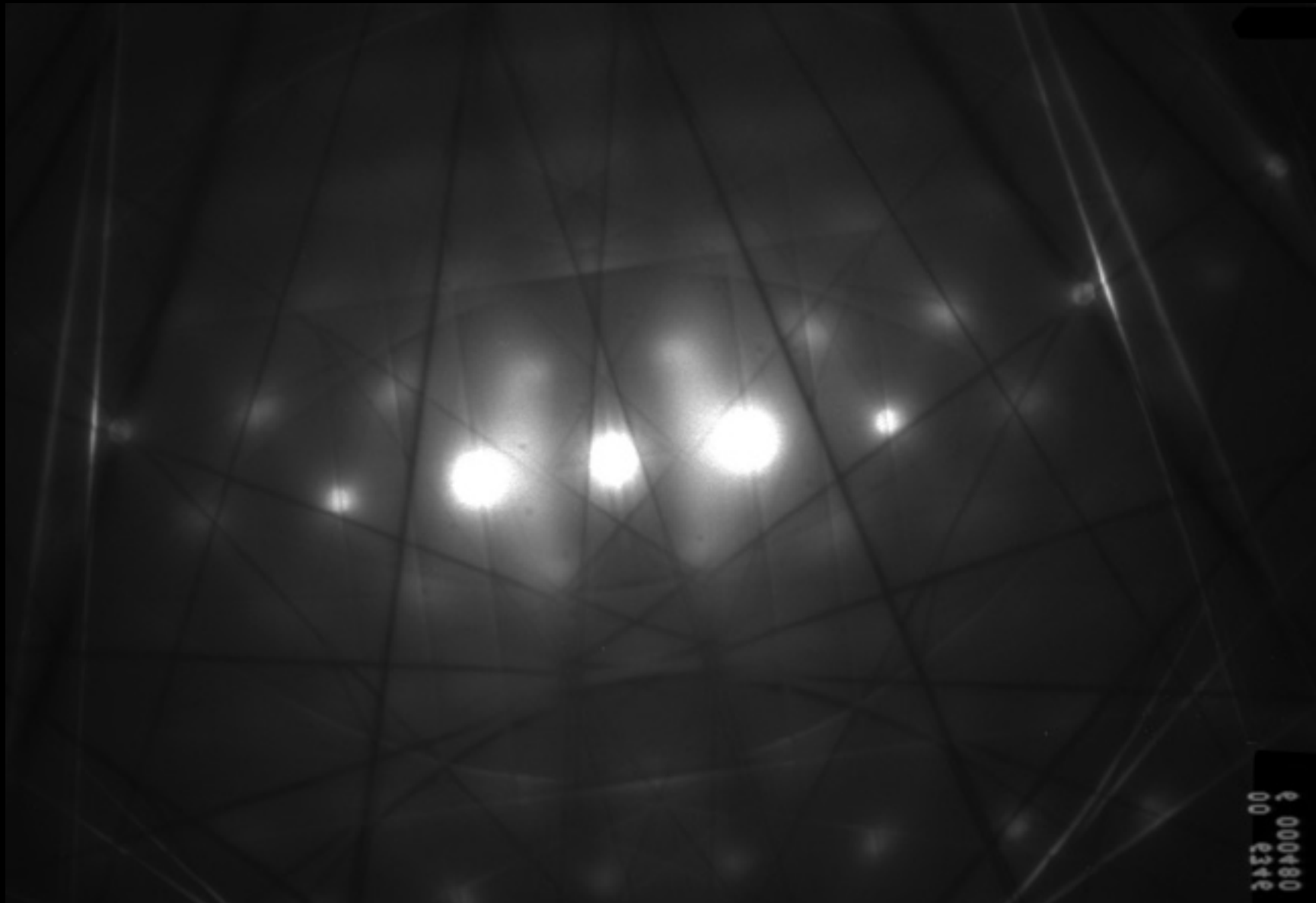
This is a black and white electron diffraction pattern. It features a central grid of diffraction spots, with a prominent vertical line of spots. Surrounding this central grid is a thick, bright ring composed of many individual spots. The background shows a faint, overlapping grid pattern, likely from the detector or the specimen. On the left side, there is a label $10\bar{9}0$ with an arrow pointing to a specific spot on the ring.



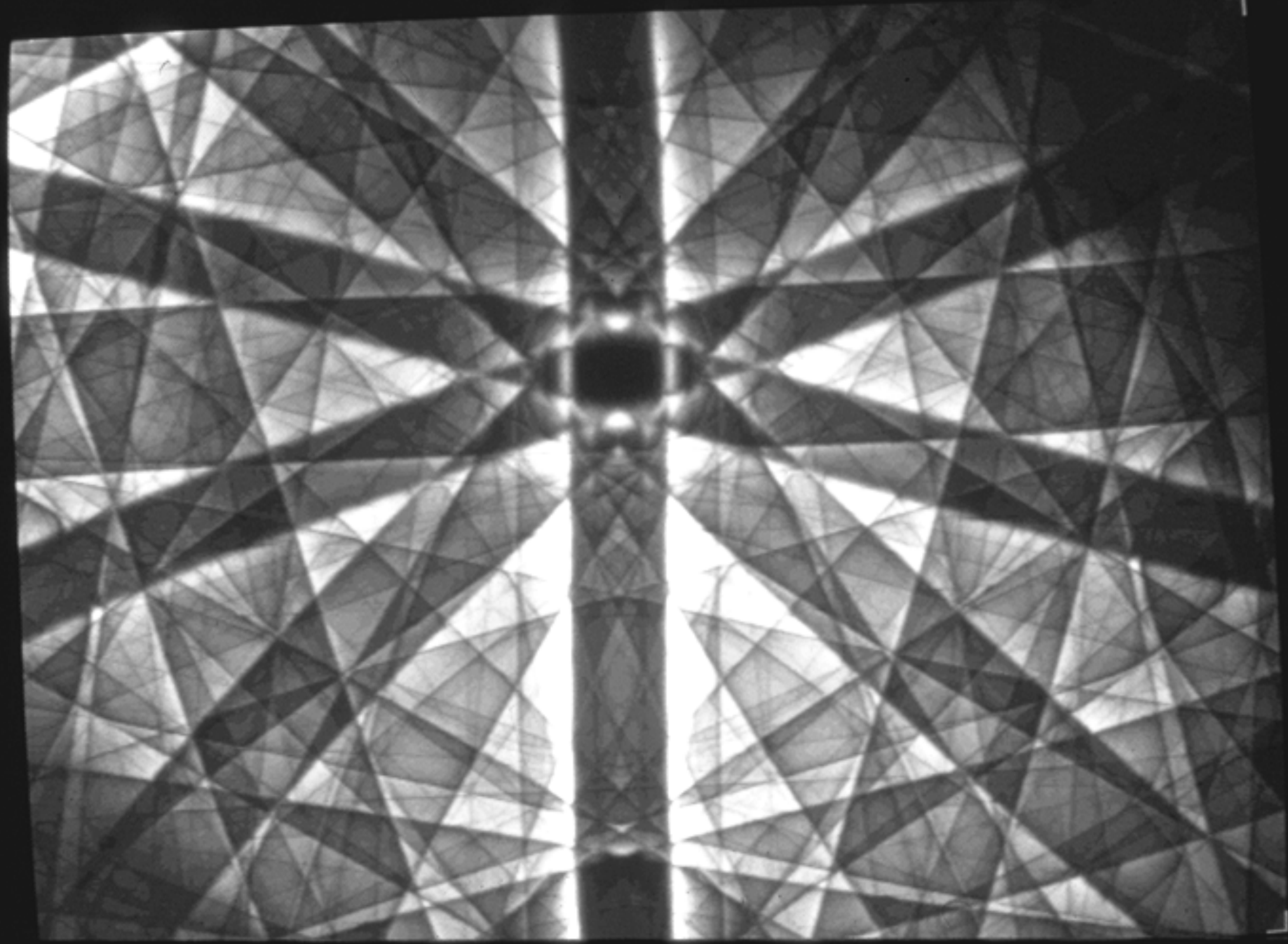


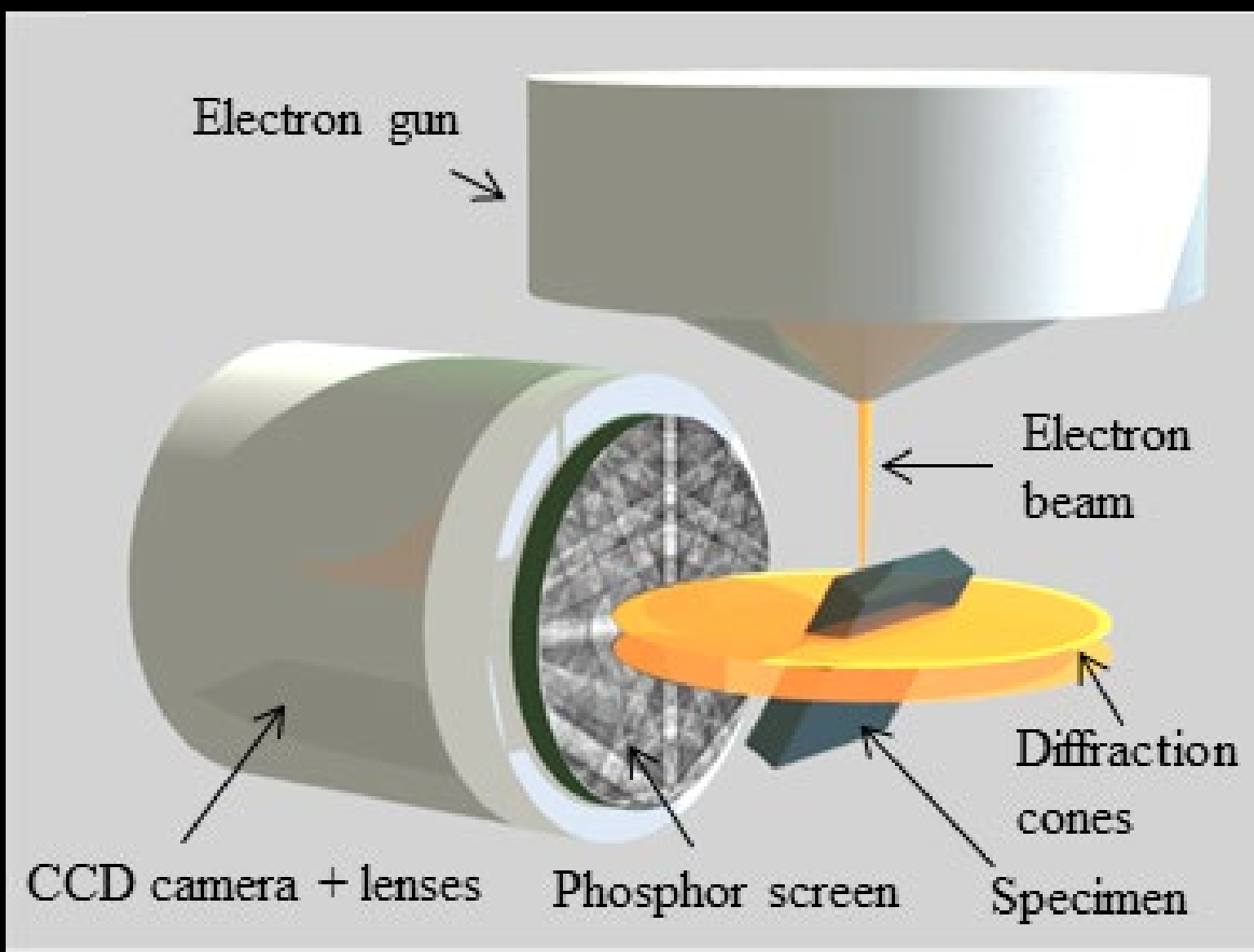
ab



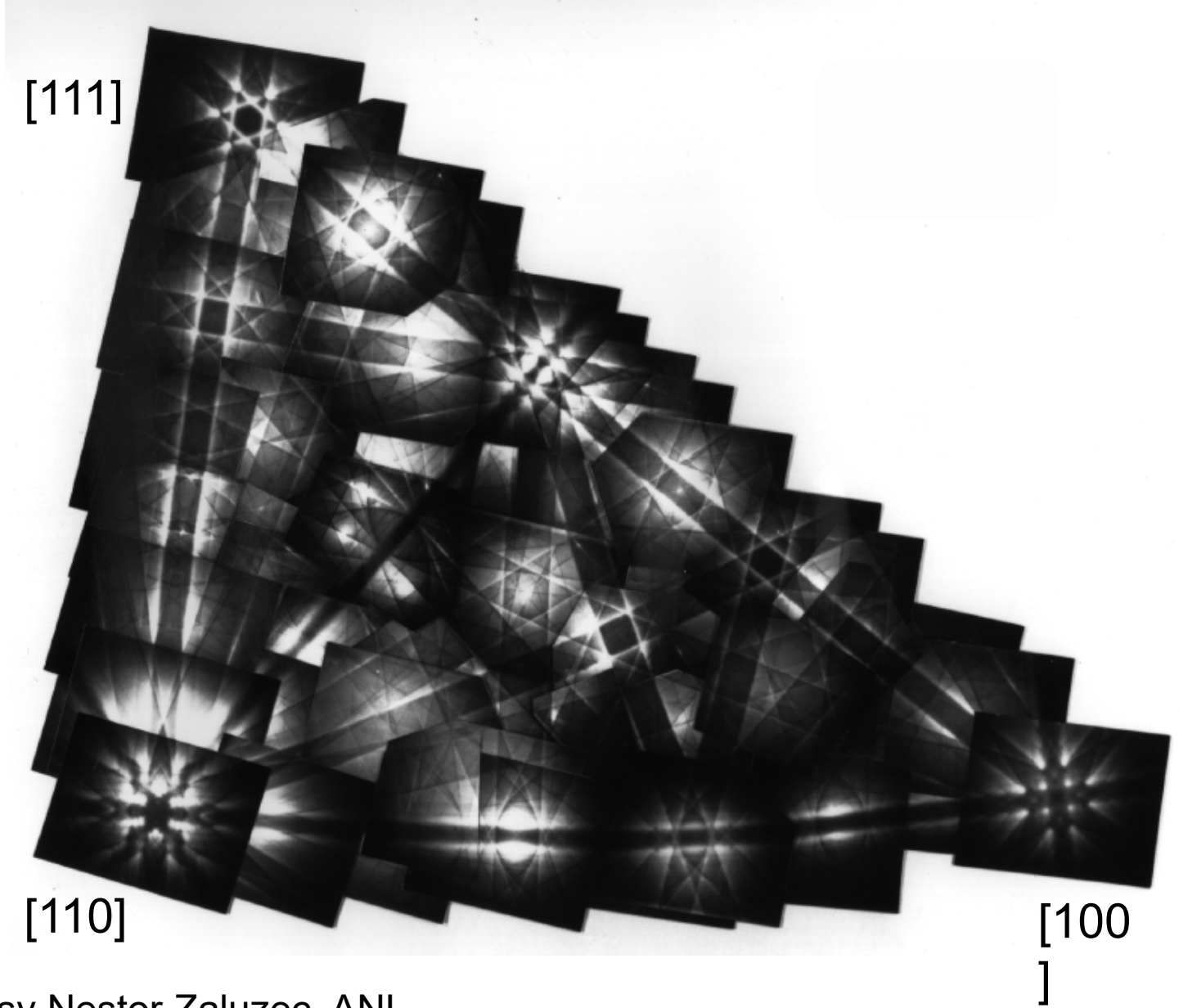


Curtesy Nestor Zaluzec, ANL



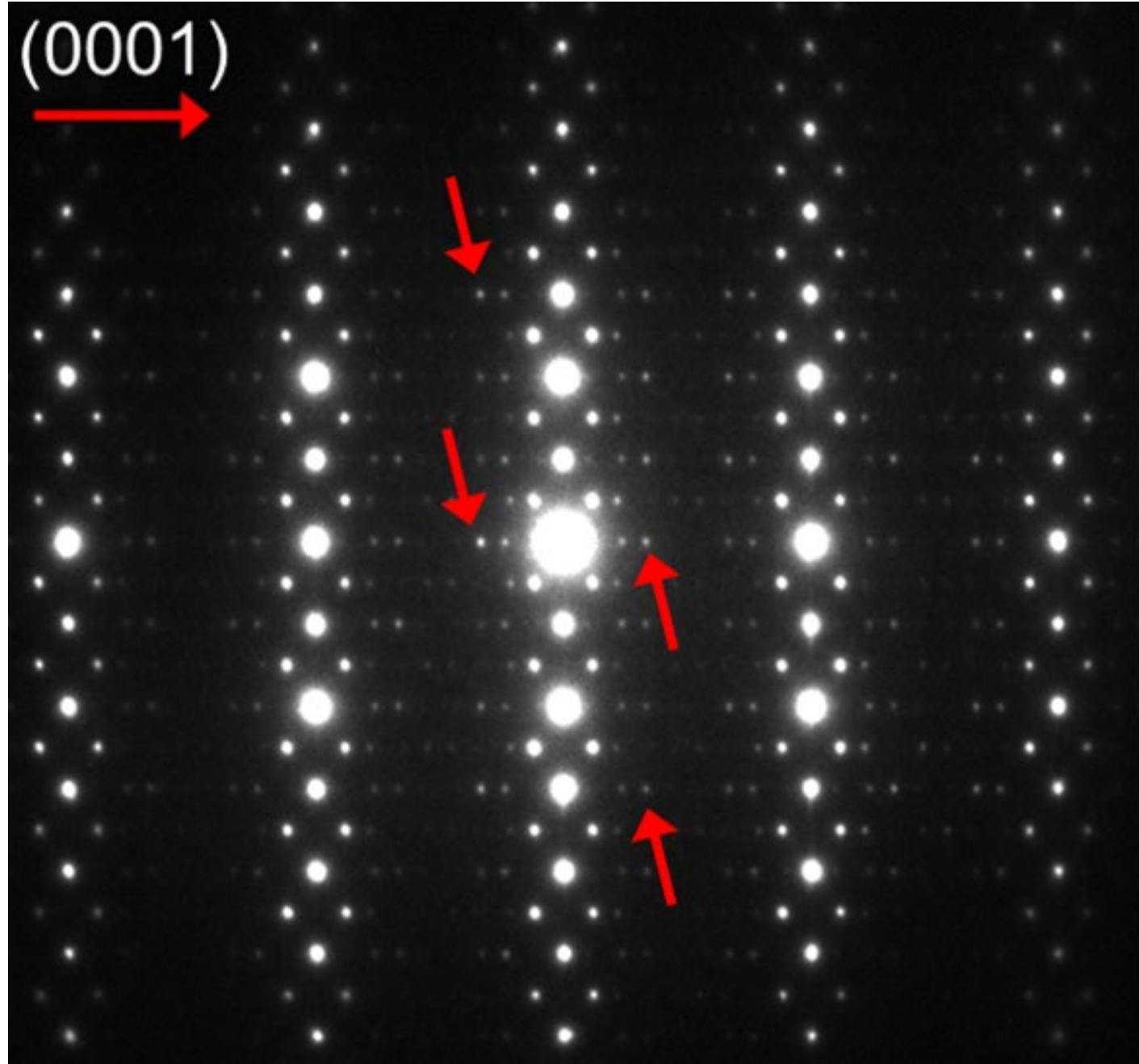


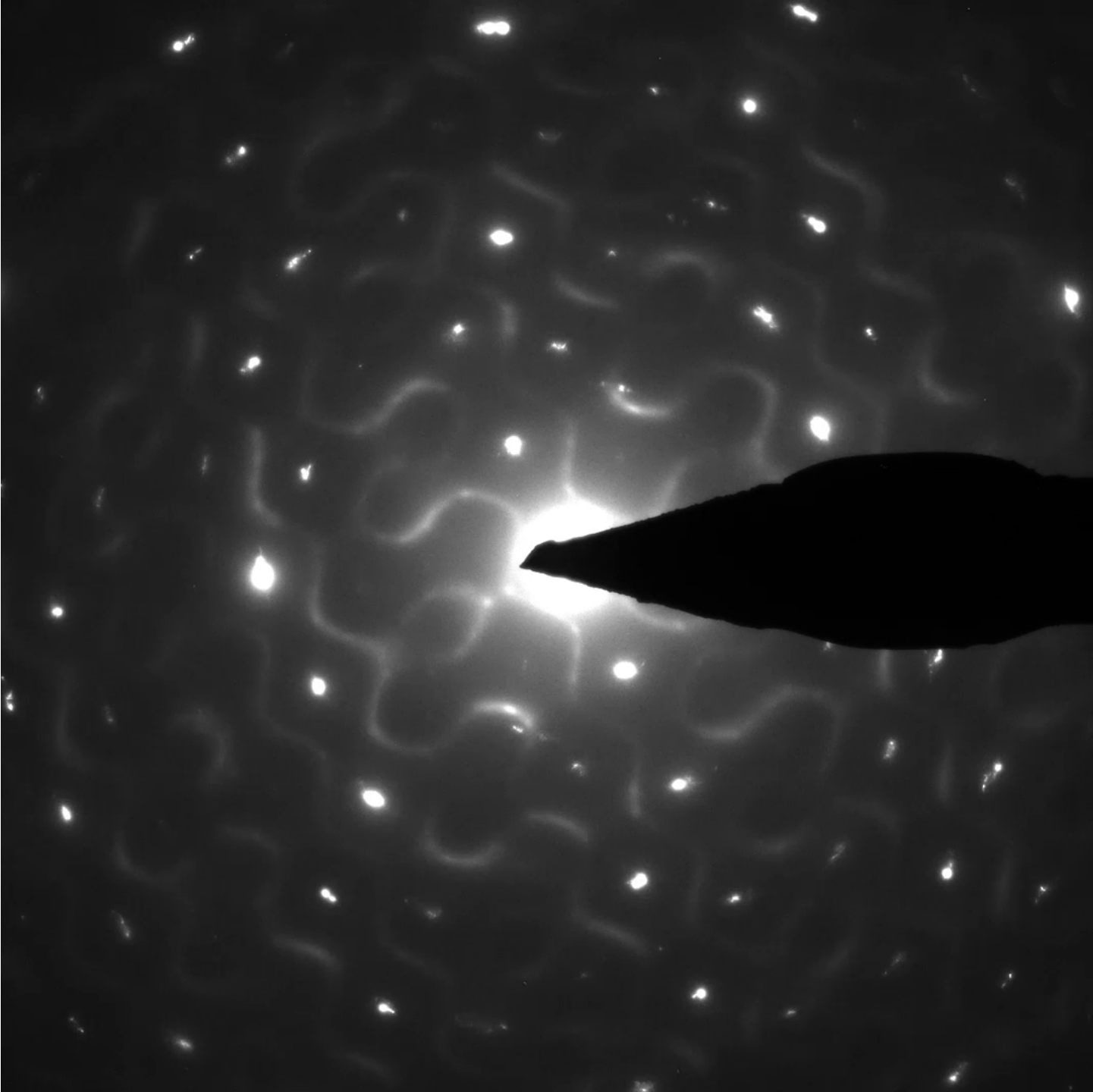
https://commons.wikimedia.org/wiki/File:EBSD_setup_graphic.png



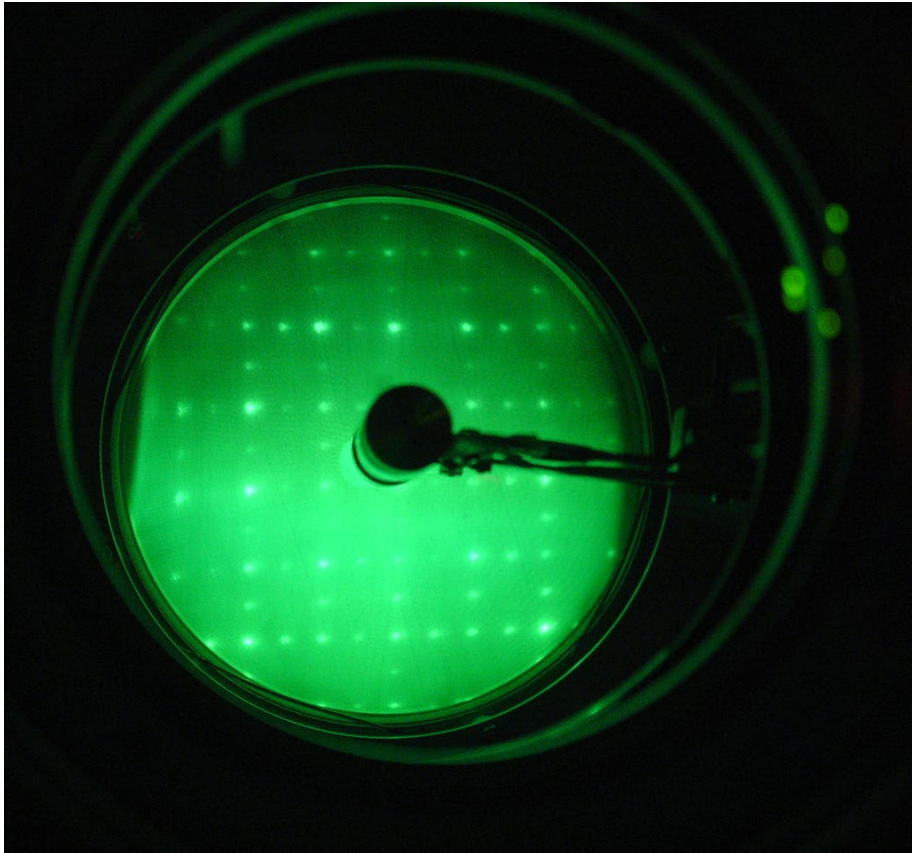
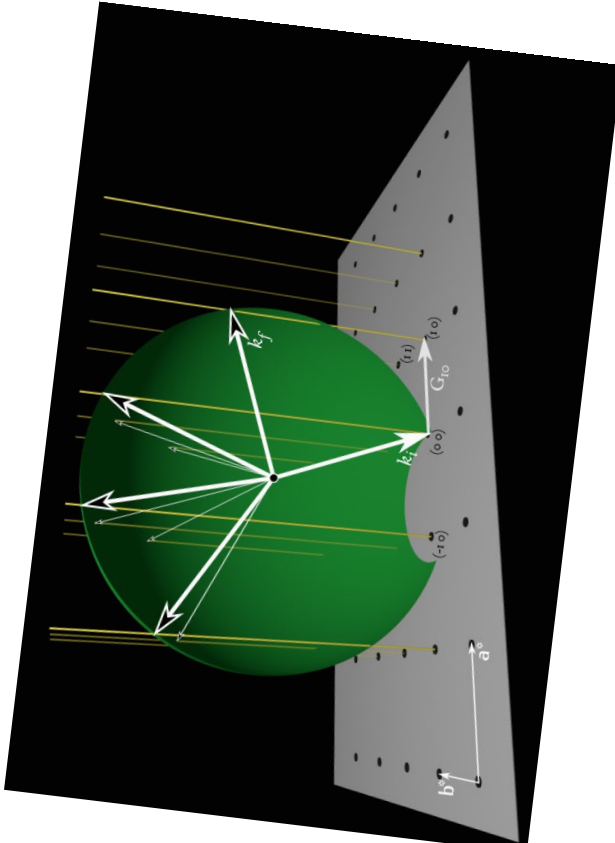
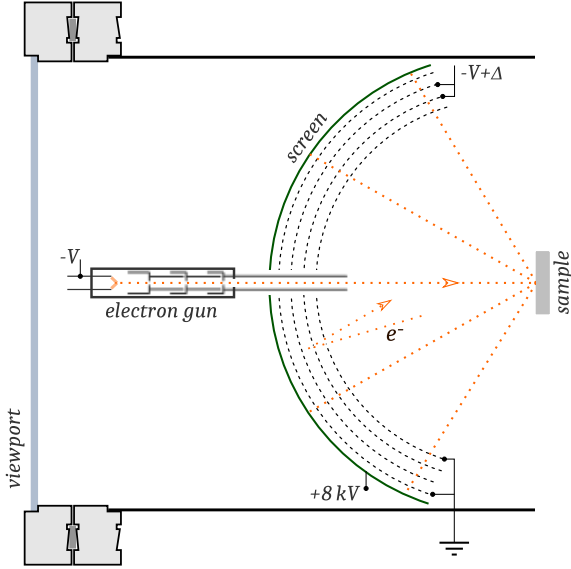
Curtesy Nestor Zaluzec, ANL

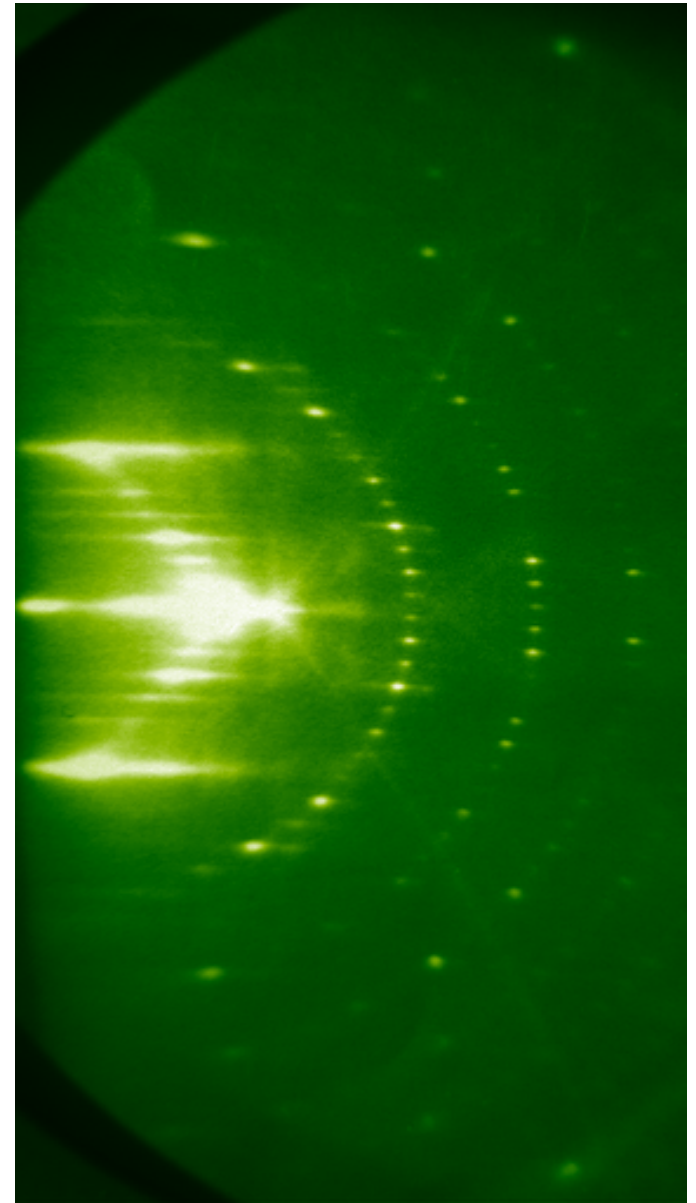
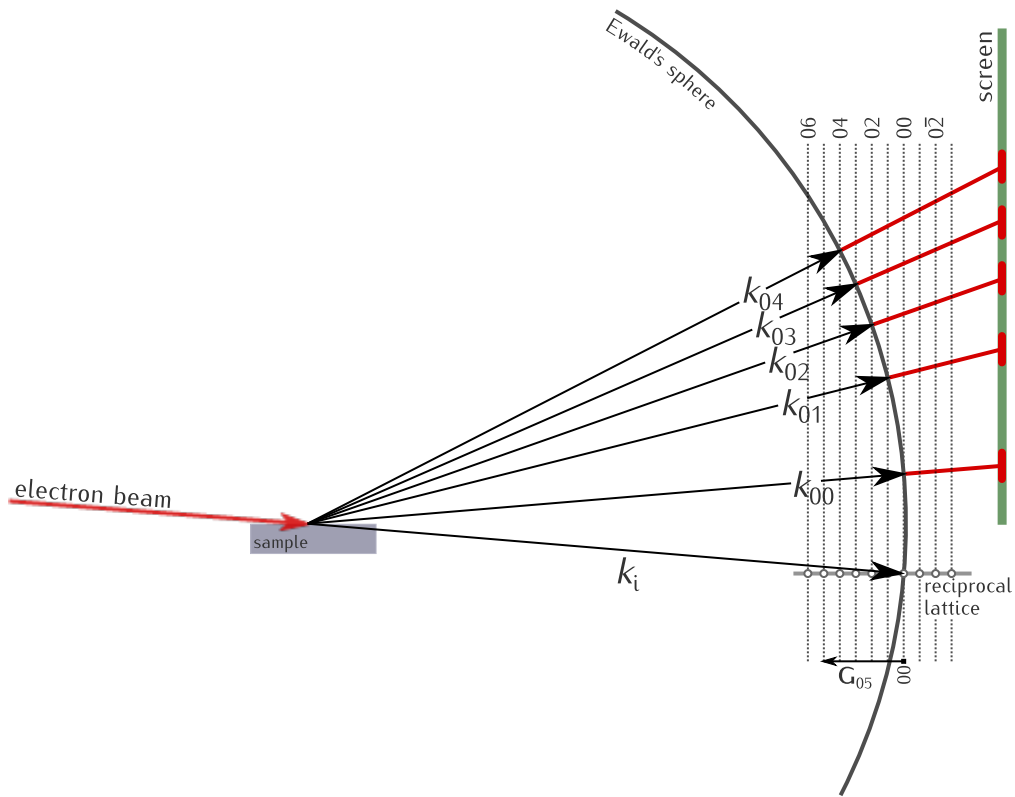
(0001)





https://en.wikipedia.org/wiki/Electron_diffraction





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