Detector Specific Corrections

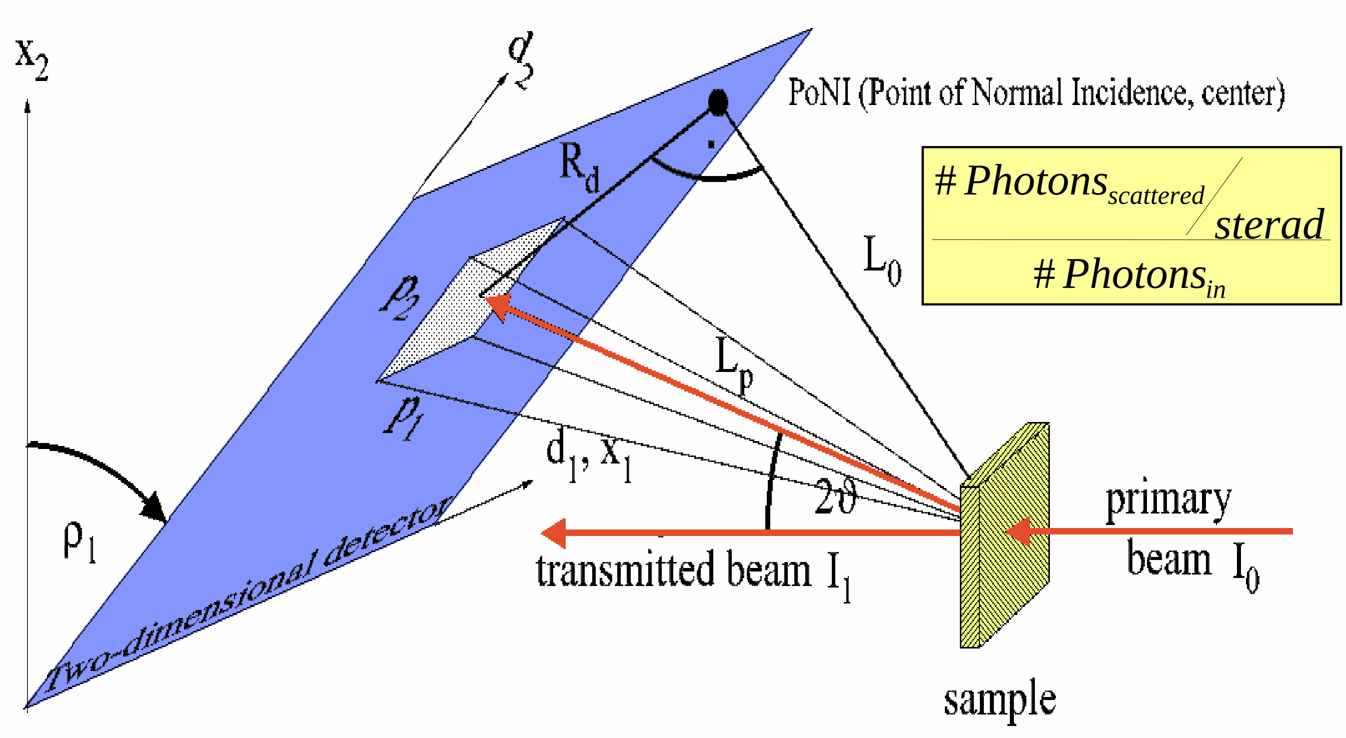
CCD raw image [ADU] i_{raw}
CCD dark image [ADU] i_{dark}
(identical exposure times)

Flat field image [photons/ADU] f_2 (corrected for distortion)

1. Dark image subtraction [ADU]	$i_1 = i_{raw} - i_{dark}$
2. Spatial distortion correction [ADU]	$I_2 = SPD(I_1)$
3. Division by flatfield [photons]	$i_3 = i_1 / f_2$

- Subtraction and division are done pixel by pixel
- The spatial distortion correction consists of a horizontal and vertical displacement of each pixel

Scattering Specific Corrections



4. Normalization to I0 [photons] and conversion to scattering cross section [1/sterad]

$$\left(\frac{1}{A}\right)\frac{\partial\sigma}{\partial\Omega} = \frac{\#\,Photons_{scattered}/sterad}{\#\,Photons_{in}} = \boxed{i_4 = \frac{i_3}{I_0}\cdot\underbrace{\frac{L_p^{\,2}}{p_1\cdot p_2}\cdot\overbrace{\frac{L_p}{L_0}}^{\text{inclined surface}}}_{1/\Delta\Omega}}$$

shortest sample to detector distance	L_0
sample to pixel distance	L_p
pixel size	p_1, p_2

(see Bösecke, Diat, J. Appl. Cryst. (1997). 30, 867-871
and Narayanan, Diat, Bösecke, NIM A 467-468 (2001) 1005-1009)

Sample and Beam Specific Corrections

5. Normalization to transmission and scattering volume, e.g. thin film: T=I1/I0, d: sample thickness

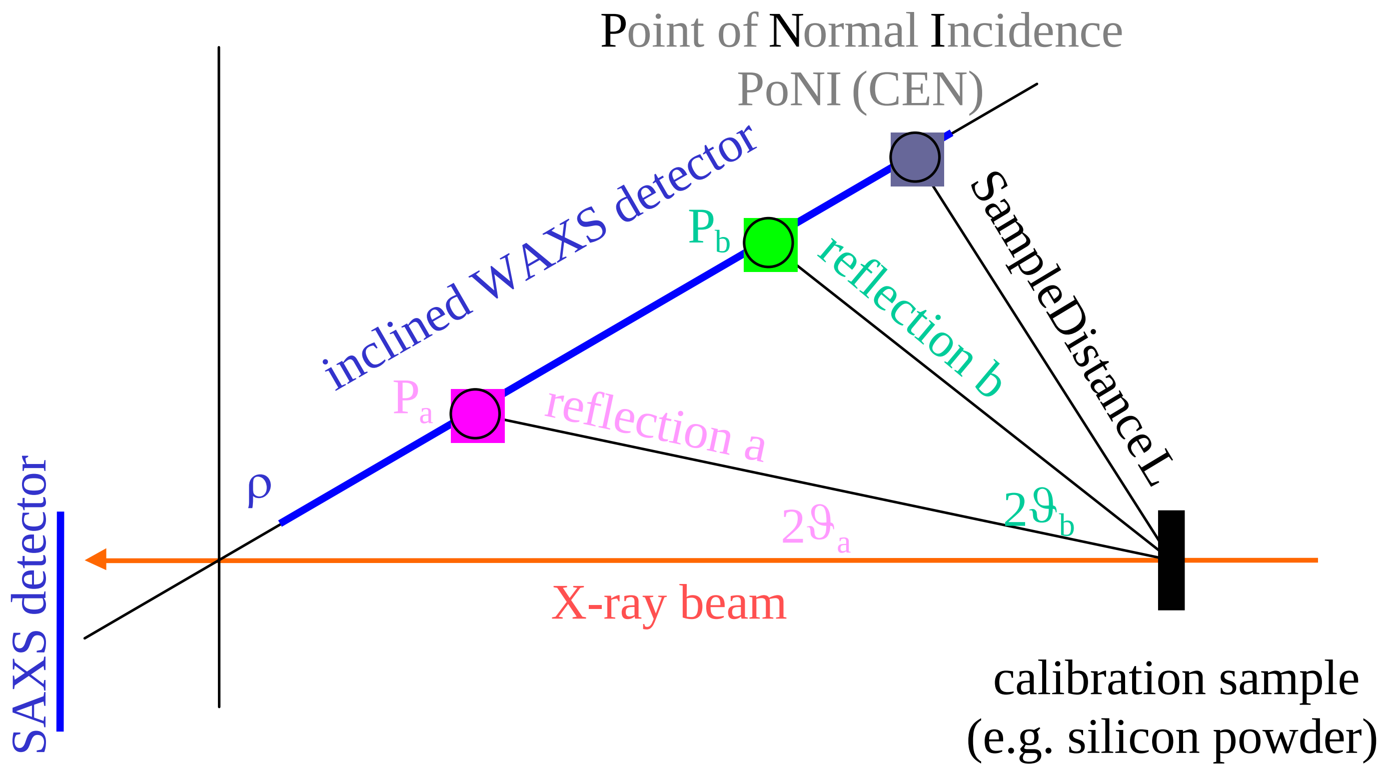
$$i_5 = \frac{i_3}{d \cdot I_1} \cdot \frac{L_p^{\,2}}{p_1 \cdot p_2} \cdot \frac{L_p}{L_0}$$

6. Polarization correction (WAXS)

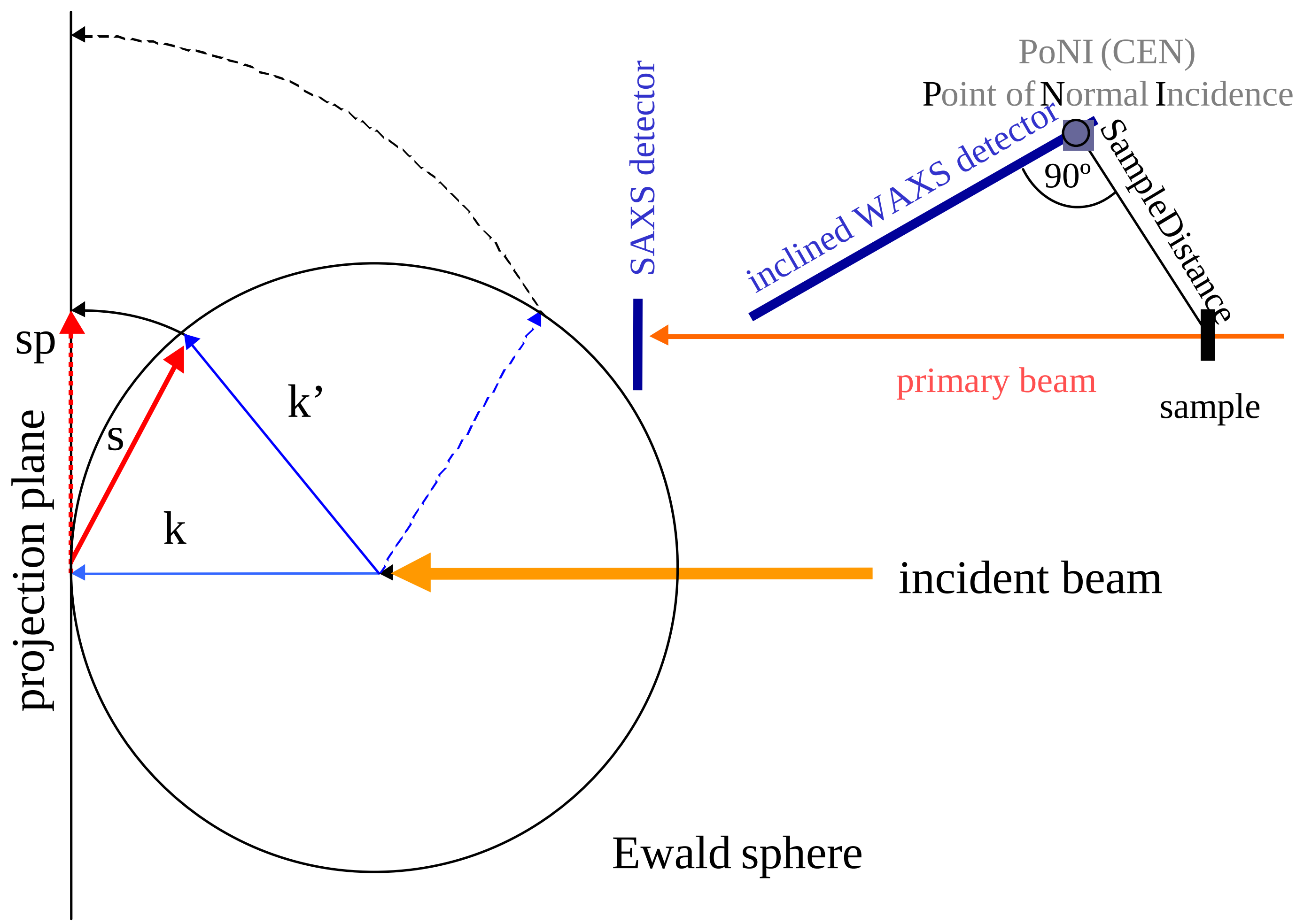
7. Reciprocal space mapping (WAXS) (Ewald sphere projections in reciprocal space, sample orientation required)

8. Azimuthal averaging

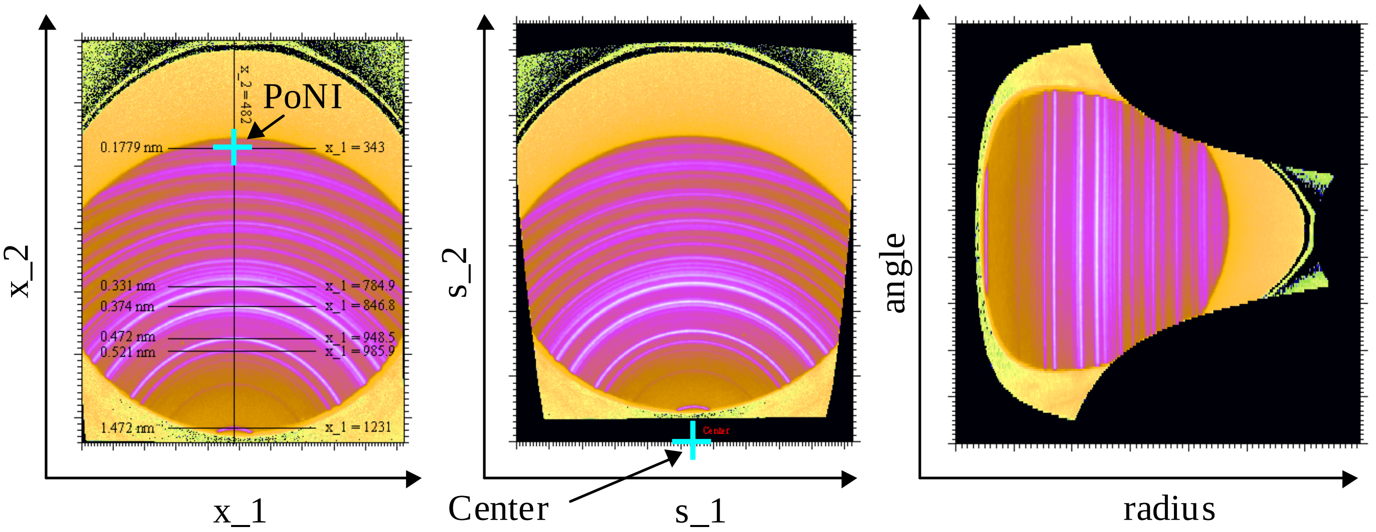
“WAXS Detector Geometrie” (real space)



“WAXS Projection” (reciprocal space)



Ewald Sphere Projection (WAXS)



raw
WAXS pattern
(inclination 32.5 degrees)

projected
WAXS pattern

azimuthally regrouped
WAXS pattern