Supporting Information
GISAXS calibration procedure

Distortion analysis of crystalline and locally quasicrystalline 2D photonic lattices with GISAXS

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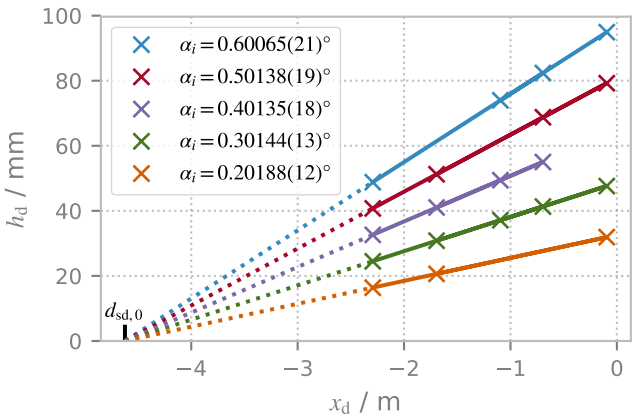

Figure 1: Determination of the sample to detector distance offset $d_{\mathrm{sd},0}$ and the incidence angle α_i by triangulation. Crosses denote the measured data, the solid lines are the fit. Dashed is the extension of the fit to the origin, which yields $d_{\mathrm{sd},0}$.

For the GISAXS measurements, the distance between the sample and the detector d_{sd} is not known *a priori*. The position of the detector on the sledge x_{d} is measured using optical encoders, so that $d_{\mathrm{sd}} = x_{\mathrm{d}} - d_{\mathrm{sd},0}$ with the sample detector distance offset $d_{\mathrm{sd},0}$. The measurement of $d_{\mathrm{sd},0}$ is performed using triangulation with the specularly reflected beam. For each detector position x_{d}, the distance on the detector between the direct beam measured without sample and the specularly reflected beam h_{d} is measured for N incidence angles $\alpha_{i,n}$, the results are shown in figure 1. The data are fitted to the model

$$h_{\mathrm{d}} = \tan(2\alpha_{i,n})\,(x_{\mathrm{d}} - d_{\mathrm{sd},0}) \tag{1}$$

using the Levenberg-Marquardt method with the free parameters $\alpha_{i,n}$ and $d_{\mathrm{sd},0}$. The resulting fit is shown in figure 1 as well. Uncertainties of the fit parameters are estimated from the goodness of the fit using the covariance matrix of the Levenberg-Marquardt fit scaled by the reduced chi-square, for a final uncertainty of 1.3 mm for the sample detector distance offset.