		Experiment title: Disorder in Colloidal Crystals: Interlayer Correlation between Stacking Islands	Experiment number: 26-02-448
Beamline: BM26B	Date(s) of experiment: 29 August 2008-31 August 2008		Date of report: -09-2008
Shifts: 6	Local contact(s): Kristina KVASHNINA		
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Report: (max. 2 pages)

As described in our proposal, the goal of the experiment was to investigate positional correlations between hexagonal layers in colloidal hard-sphere crystals with random hexagonal close-packed (rhcp) structure. This was planned to be achieved by measuring the width of Bragg rods at various points along their long axis. The reason to apply for beam time at DUBBLE was the possibility to work with microradian resolution. Yet, determination of the intrinsic width of the reflections in highly-ordered colloidal crystals remains a great challenge.

Despite the challenge of the scientific problem, only 6 shifts were allocated to this experiment, *which already made the chance for success close to impossible*. To do our best, the experimental team arrived at the ESRF already on Monday, 25th, to start preparing for the difficult experiment. However, due to technical problems at the beamline, it was not possible to do any measurements for a large portion of the time despite hard efforts of the beamline staff. When the beam was finally restored in the experimental hutch, we have failed to properly focus it using a set of Be lenses. This indicated a strong distortion of the phase front of the beam before it arrived into the experimental hutch. To illustrate this, Figure 1 shows diffraction patterns from a calibration silicon grid with a periodicity of 1.5 microns. We compare results obtained with the usual microradian resolution at DUBBLE and with the resolution of the present experiment. A further illustration is given in Figure 2, which displays intensity profiles. Both profiles have been scaled to show 14 peaks. The difference in resolution is obvious. In that situation we were unable to do anything for the proposed experiment.

As this experiment is still relevant and highly desirable to fulfil our research program, we would like to resubmit our proposal for the coming beam-time allocation period.

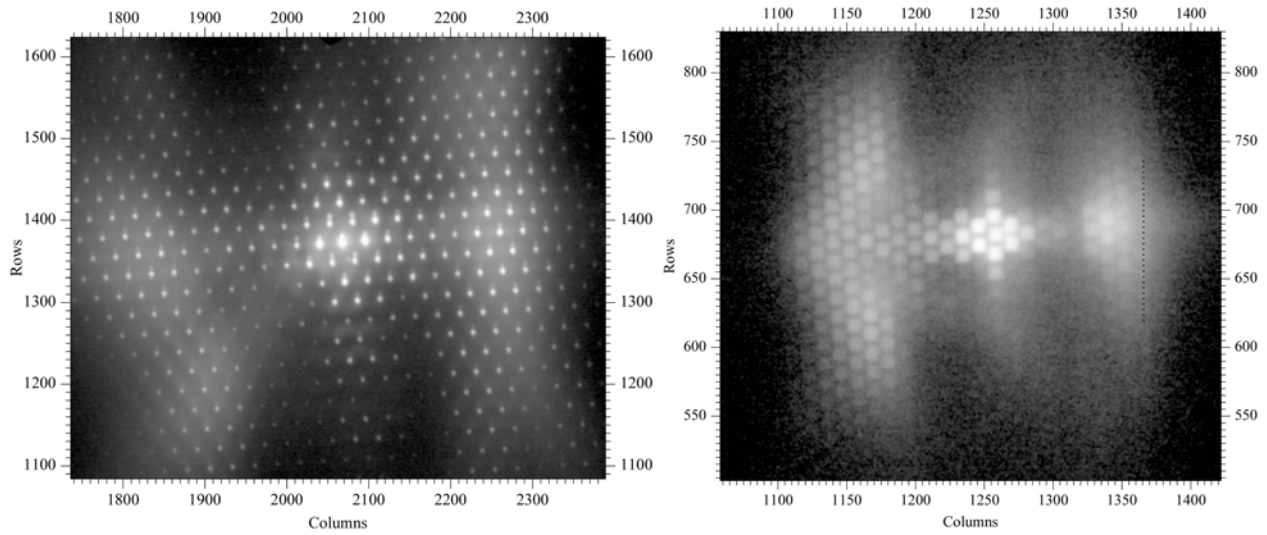


Figure 1. Diffraction patterns obtained from a silicon calibration grid of lithographically-fabricated lattice of holes separated by 1.5 microns distance. The patterns are measured in April 2008 (left) and in the present experiment (right).

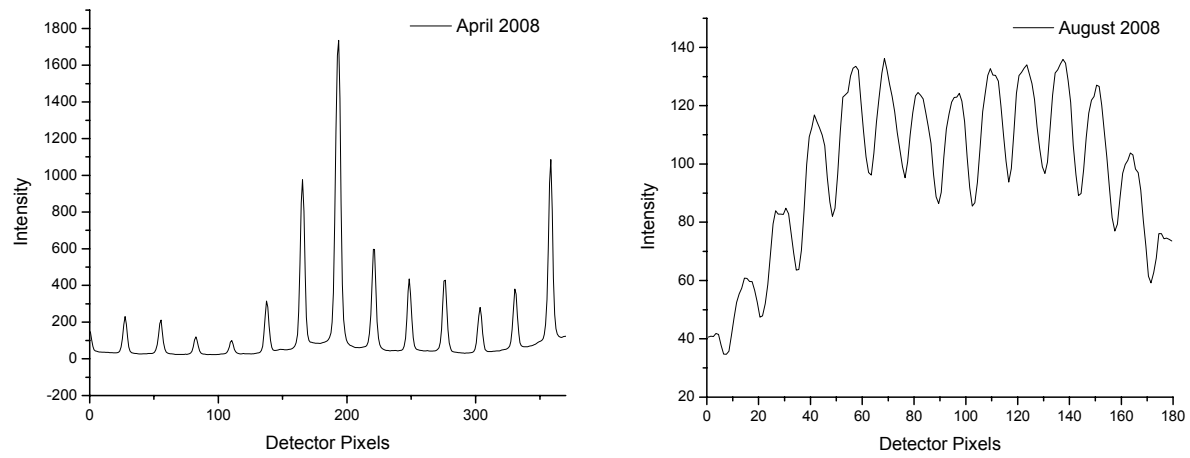


Figure 2. Intensity profiles along lines connecting neighbouring diffraction peaks in the patterns displayed in Fig. 1.