For this beamtime, prepatterned GaAs substrates have been prepared at the CFN, KIT [1]. and were transferred to ESRF maintaining UHV conditions. For the in-situ experiment a portable MBE chamber [2] has been mounted on the diffractometer at ID03.

During the beamtime SI2338 two samples were studied in-situ, during growth and post-growth annealing by means of GID and GISAXS. The growth environment was provided by the portable MBE.

Due to a leak in the MBE system which occurred during transportation, the in-situ experiment was delayed. During the repair, several samples featuring self-organized InAs quantum dots and site-selective quantum dots have been studied ex-situ.

In-situ, as well as the ex-situ data on the site-selective quantum dots have contributed to a review paper, published in PSS (a) 2012 [1].

Ex-situ and in-situ measurements using a focused X-ray beam (E=13 keV) and GID geometry was used for sample characterization [1]. As it was shown, GID demonstrated an excellent potential for studying the pattern, and the average shape of the nucleation-sites. A change in the shape, which is found to be elongation and internal faceting due to the growth of the buffer layer prior to the deposition of the QD ensemble and corresponding annealing procedures have been revealed experimentally.

At the same time, GID alone could not provide information concerning the site-selective QD's shape and strain, while the signal from the patterned nucleation-sites (well ordered wholes) completely dominated over the comparatively weak diffusely scattered intensity from QDs.

To overcome these problems, a completely new diffraction approach was elaborated and successfully tested. The method assumes the utilization of the extremely asymmetric skew (non-coplanar) geometry in combination with a special scan arrangement maintaining a constant incident angle.

This approach permitted us to investigate polar reflections, including quasi-forbidden ones, which were out of reach using the commonly accepted approaches on (001) oriented substrates.

Besides other results, a reliable information about the QD correlation (pattern hole occupancy) have been obtained.

A paper which is intended to describe the geometry of the new-coming method, developed in this very beamtime at ESRF is ready for submission to Journal of Synchrotron radiation this year .

Further ex-situ GID data obtained during SI2338 on self-organized quantum dot samples have lead to a paper dealing with size and composition changes of QDs during capping are discussed, which is ready for submission to Applied Physics Letters .

1. M. Helfrich, P. Schroth, D. Grigoriev, S. Lazarev, R. Felici, T. Slobodskyy, T. Baumbach, and D. M. Schaadt,“Growth and characterization of site-selective quantum dots” *Phys. Stat. Sol. A, 1-15 (2012)*
2. T. Slobodskyy, P. Schroth, D. Grigoriev, A. A. Minkevich, D. Z. Hu, D. M. Schaadt, and T. Baumbach, A portable molecular beam epitaxy system for in situ x-ray investigations at synchrotron beamlines”, *Rev. Sci. Instrum.* ***83****, 105112 (2012)*