

Protein Crystal Quality Studies using high Resolution X-ray Diffraction

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During the last years a number of papers were reporting about a positive effect of magnetic fields on the quality of protein crystals. All this findings are based on a limited number of experimental data.

To systematically investigate this proposed effect of homogeneous magnetic fields, crystals of 4 different proteins were grown in magnetic fields of up to 16 Tesla. Another application of magnetic fields in protein crystal growth is the crystallization of proteins in inhomogeneous magnetic fields. The effect of inhomogeneous magnetic fields on the crystal quality was studied on 3 model proteins.

The quality of the crystals grown with and without homogenous and inhomogeneous magnetic field was subsequently determined by means of high resolution rocking curve measurements. Comprehensive intensity data sets were taken as well. A detailed analysis of the results will be presented, based on measurements of more than 200 crystals.

The mosaicity measurements were carried out at the Petra-1 undulator beam line at DESY in Hamburg. The 6-circle diffractometer installed at the beamline allows the determination of the orientation matrix and the measurement of reflection profiles at arcsec resolution of 4 reflections each at three azimuthal angles in less than 20 minutes. It is therefore very well suited for comparative crystal quality studies.

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