

## **Real Time Data Analysis of Grazing Incidence X-Ray Scattering Data**

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There is a great interest in materials such as thin films of conductive polymers, organic photovoltaics and thin films of nano-particles etc. Grazing incidence small angle scattering and wide angle scattering (GISAXS/GIWAXS) techniques serve as important tools to study the mesoscopic structure of such materials. It is evident from the fact that more than 60% of experiments on SAXS/WAXS beamline at the Advanced Light Source (ALS) are grazing incidence. However before any analysis can begin, one need to determine the coordinates of detector image in reciprocal space. Each set of images taken at beamline come with a corresponding Silver-Behenate (AgB) image as calibrant. Since the peak spacings of AgB in reciprocal space are well established, if we know the incident angle, we should be able to determine the momentum transfer vector ( $q$ ) for every pixel. We have developed software suite at ALS which, in following steps, (i) determine approximate direct-beam, (ii) determine approximate sample-detector distance, (iii) iteratively refine these values, using part of code from from Dpdak [1]. Every image taken at the beamline is sent to supercomputing facility at the Berkeley National Lab, where it is automatically calibrated, indexed and stored, so that scientists have access to their calibrated data almost in real time. In addition, GIWAXS images are corrected for the curvature of Ewald sphere. Radial average of every image is also calculated and plotted. Users can access the data through a web interface, SPOT Suite.