

THE NON-CRYSTALLINE DIFFRACTION BEAM LINE AT ALBA: A STATUS REPORT

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The non crystalline diffraction, NCD, beam line is to be connected to Port 11 at Alba, a third generation Synchrotron Radiation Facility currently under construction in Cerdanyola del Vallés, Barcelona, Spain. This 3 GeV electron storage ring will run with a maximum stored beam of 400 mA and is expected to be in routine operation from early 2010.

NCD experiments record scattering both at low and high angles and constitute a non-destructive method that provides simultaneously structural and functional information of samples at the molecular level. In addition, time-resolved diffraction studies is a structural technique that allows an insight into structural dynamics. Such experiments require high photon flux and small focal spot. The specific aim of the user community is to study semi-ordered systems, long-range structures, diffuse systems, solution and bulk scattering in life and material sciences.

The chosen optical layout aims at delivering high photon flux density on the sample. By combining a vertically collimating mirror and a horizontally and vertically focusing toroidal mirror with a 2:1 demagnification. The optical arrangement partially compensates for aberrations introduced by individual optical elements such that a small focal spot of high quality is achieved. The layout is optimized at 10 keV ($\lambda=1.24 \text{ \AA}$) but allows for variable photon energies between ca. 6.5 -13 keV with an expected flux at sample of ca. 2×10^{12} ph/s. The photon source will be an in-vacuum undulator, U21 in order to take full advantage of the high natural collimation of the beam emitted by Alba. The sample stage is movable along guide rails for optimizing the sample to detector distance with respect to SAXS resolution and sample size [1].

The presentation will cover the current status of the NCD beam line until present as well as a time-table for its assembly. A brief overview of the experimental station with associated detectors for static and time-resolved measurements and its modular arrangement that will allow a choice between small angle scatterings for samples of long range periodicities or microfocus illumination of sample will be discussed [2].

References

- [1] – <http://www.cells.es/Divisions/Experiments/BeamlineProposals/NCD>, 2005.
- [2] – <http://www.cells.es/Beamlines/NCD>, 2007.

