

A Design for a New State-of-the-Art Diffraction Facility

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We present the details of a new state-of-the-art diffractometer being constructed in the crystallography laboratory in the University of Durham. The machine is designed for single crystal diffraction experiments, to explore new extremes in sample environments and combinations thereof.

The new machine, accessing areas of structural chemistry that have hitherto been unreachable in the home laboratory, will comprise: a high intensity X-ray beam to enable crystals too small for standard laboratory machines to be studied; a three stage Displex cryo-cooler which will have a temperature range of ~2-300 K, carried on a robust set of circles and a large, motorised CCD detector. The Displex will be capable of housing Diamond Anvil Cells (DACs), both fixed pressure and variable pressure designs. The Displex will be modified to create a laser injection point enabling sample irradiation at a variety of laser wavelengths, while at very low temperatures. The combination of beryllium housing for the sample environment and the large CCD detector require us to devise solutions to separate the beryllium scatter from the desired diffraction. These solutions will be discussed, including preliminary results from a software collimator, currently under development in the crystallography laboratory, University of Durham.

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