BRITTAX

BRITish Two-AXis CRG proposal

A Proposal for a UK-CRG High Flux Diffractometer in the D1A position

See: http://icsd.ill.fr/uk-crg/

We propose to capitalise on the new techniques for detectors and neutron optics, developed with recent EPSRC investment in ILL projects, to provide a unique high flux CRG diffractometer in the present D1A position.

This machine will use a detector of the type developed for the EPSRC-D19 project, a supermirror guide constructed as part of the EPSRC Strain Imager project, a large focussing monochromator and software developed for the EPSRC-D2B project.

This new CRG diffractometer will be comparable to D20 for flux, and to D1A for resolution but will also be used like D19 for single crystals.

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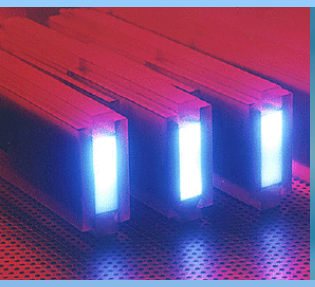
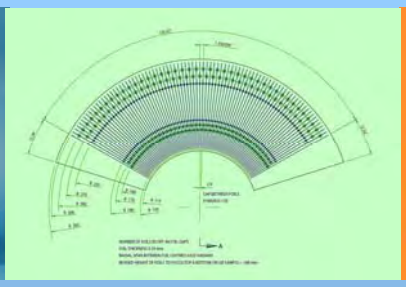
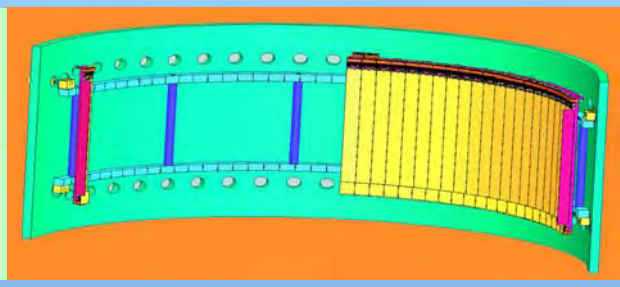
Why is BRITTAX needed ?

Neutron diffraction has been vitally important for the development of many of the most exiting new materials – di-electrics, superconductors, giant-magneto resistive manganites, fullerides, zeolites, clathrates… and of course new types of magnets. An active materials programme requires rapid access for very many small samples, yet users must now wait months for neutron diffractometers. The BRITTAX CRG will be a fast medium-resolution machine that will be available at short notice for the characterisation of both powders and single crystals under all conditions of temperature and pressure. It will be a workhorse machine for the UK community, much like D1B for the French community, but with state-of-the art monochromators, collimators and a much larger 2D detector.







M=2 Super Mirror Guide: **Focussing Mono:** **Fine Focus Radial Collimator:** **Large 2D Position Sensitive Detector cf D19 120° x 32°**

Wavelengths & d-spacings: Ge $2\Theta_M$=90° (2Θ=60°-120°)

[115] -> 1.54 Å;		d= 0.89 Å - 1.54 Å
[113] -> 2.44 Å;	(graphite filter)	d= 1.39 Å - 2.44 Å
[111] -> 4.61 Å;	(beryllium filter)	d= 2.66 Å - 4.61 Å

	D20	GEM	BRITTAX
time averaged sample flux	$5x10^7$	$\sim 2x10^6$	$\sim 10^7$
detector solid angle (sr)	0.27	4.0	1.0
efficiency	1.7	1	1.2

Scientific Problems to be addressed with BRITTAX

- Complex Structural Problems & Small Samples of Mixed Metal Oxides
- High Pressure Synthesised Materials & In-Situ Measurements
- High Pressure/Temperature Behaviour of Minerals
- Novel Ferromagnetic and Intermediate Valence C60-based Materials
- Transition Metal Oxides, Fluorides and Sulphides
- Structural Studies of Relaxor Ferroelectrics
- Magnetism and Polarised Neutron Powder Diffraction
- Functional Organic Materials
- Molecular Compounds with Pharmaceutical & Photo-Optical Applications.
- Small Single Crystals and Weakly Diffracting Samples