



# Neutron CCD Cameras

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## An inexpensive neutron CCD sample alignment camera

- Replaces neutron Polaroid camera
- Real-time integration, 1/30<sup>th</sup> to 10 seconds
- From 80x60 mm to 200x200 mm area
- Dynamic Range of 10<sup>4</sup> to 10<sup>9</sup> n.cm<sup>-2</sup>.sec<sup>-1</sup>



The compact 80x60mm neutron alignment CCD camera



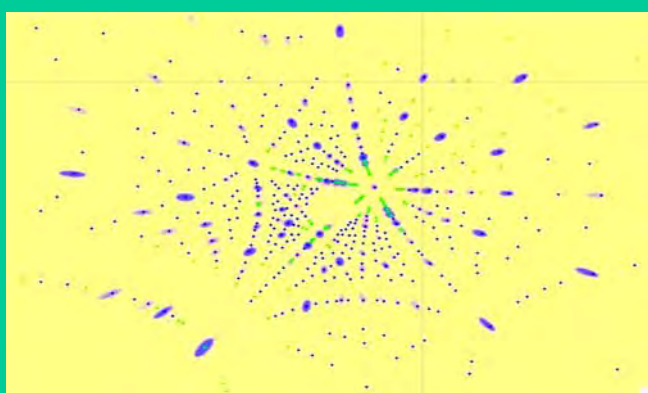
Video of PG monochromator on a 100x100 mm CCD camera

## OrientExpress – a neutron CCD crystal alignment camera

- B. Ouladdiaf, G. McIntyre, D. Brau et al.
- Image-stitched pair of lens-coupled CCDs
- Replaces wet-film neutron Laue camera
- x10 faster than film techniques



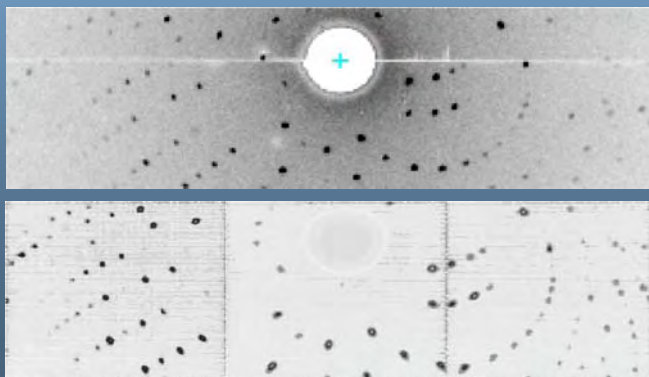
OrientExpress, prototype cooled CCD neutron detector at ILL



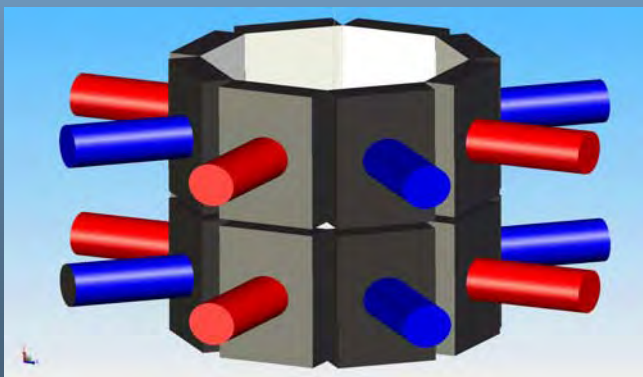
10 sec OrientExpress exposure (Al<sub>2</sub>O<sub>3</sub>) auto-indexed (fine spots)

## Cyclops – A 4π neutron CCD camera with >10<sup>9</sup> n.cm<sup>-2</sup>.sec<sup>-1</sup>

- B. Ouladdiaf, G. McIntyre, D. Brau et al.
- x16 image-stitched lens-coupled CCDs
- Complements neutron image plates
- Real-time magnetic/structure transitions



a) 12 hours Image Plate b) 1 hour D19 proto. (8 mm<sup>3</sup> lysozyme)



CYCLOPS, Octagonal array of x16 cooled CCD neutron detectors