

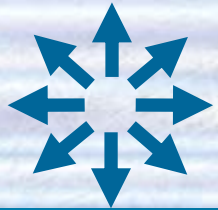
NeutronOptics Grenoble



<http://neutronoptics.com/>

Who are we ?

- NeutronOptics is a small Grenoble company (France)
- We develop and market X-ray and Neutron cameras
- For both Beam Alignment and High Resolution Imaging
- Founded in 2007 by Dr Alan Hewat, formerly from ILL
- Who are our Clients ?



NeutronOptics Grenoble



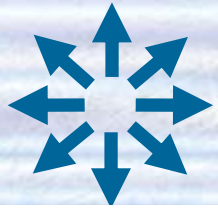
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Who are our Clients ?



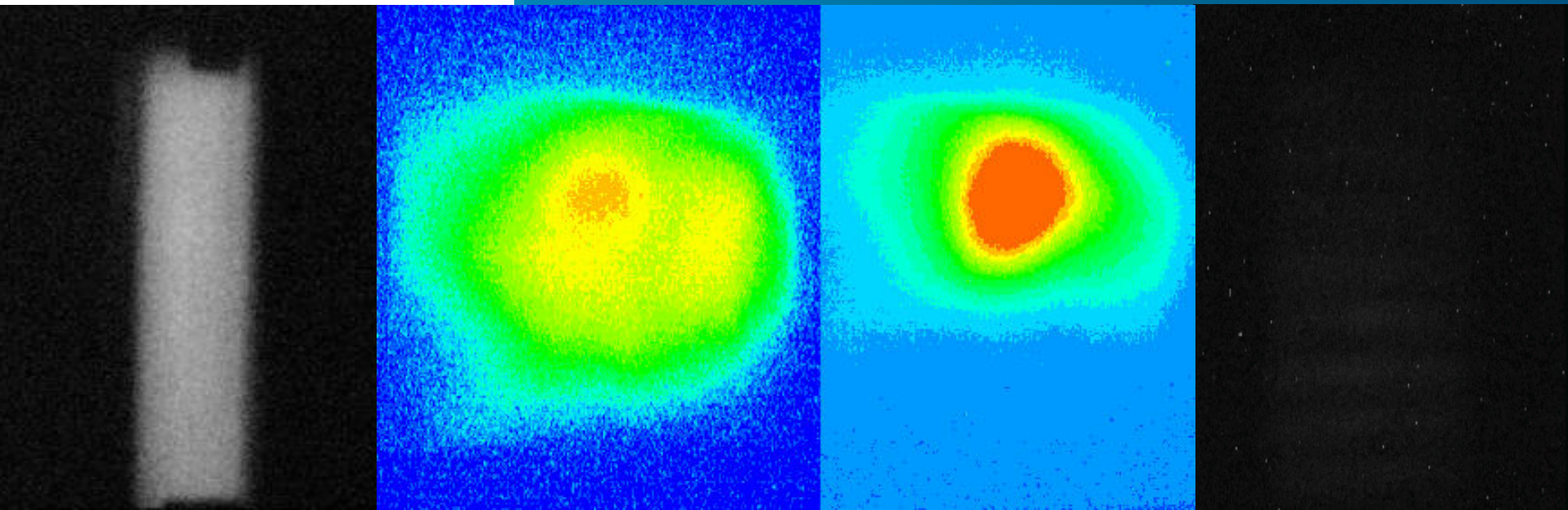
● More than 200 NeutronOptics cameras delivered

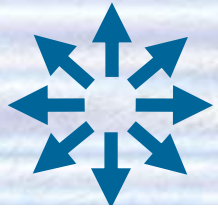
Alan Hewat, NeutronOptics Grenoble 2015



Simple Alignment Cameras

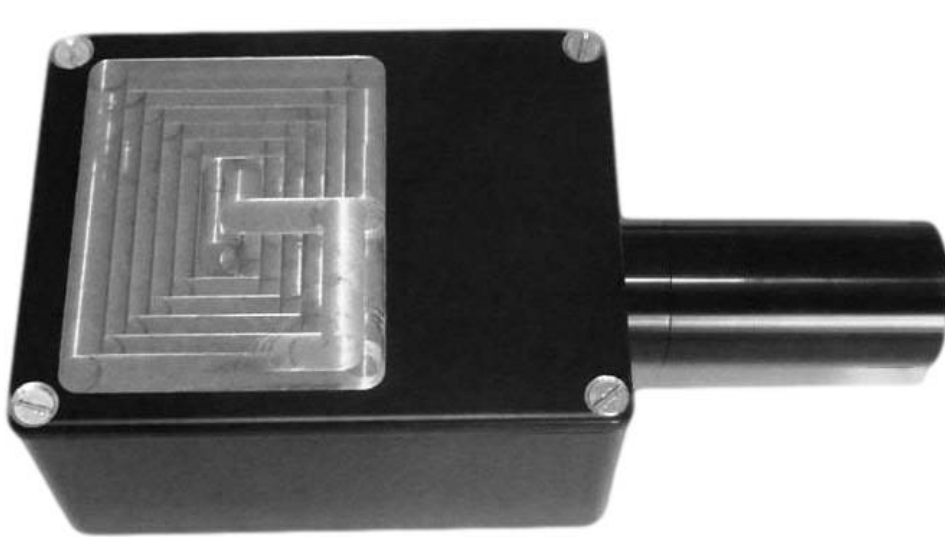
- Very sensitive Sony B&W video camera with controller
- Location of empty vanadium can in neutron beam (Chalk River)
- Un-focussed Monochromator (BARC)
- Focussed Monochromator (BARC)
- Mis-alignment of a Composite Monochromator (ILL)



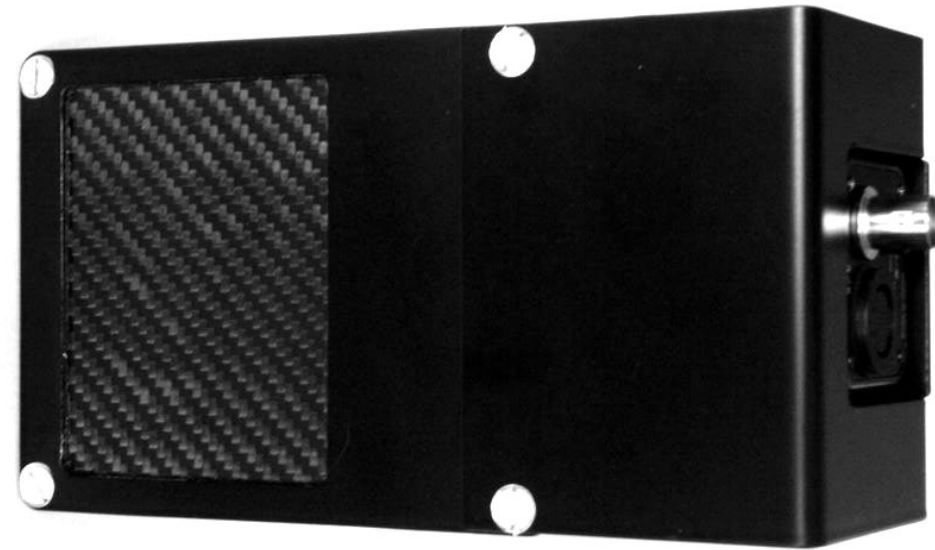


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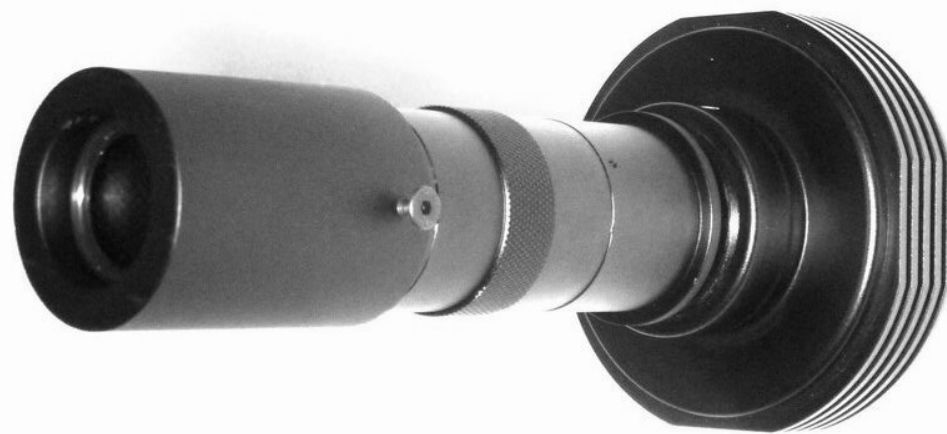
● Sensitive USB neutron Camera



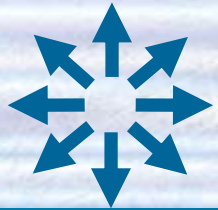
● X-ray Cameras with Carbon Windows



● Mini i-Cam for X-rays or Neutrons

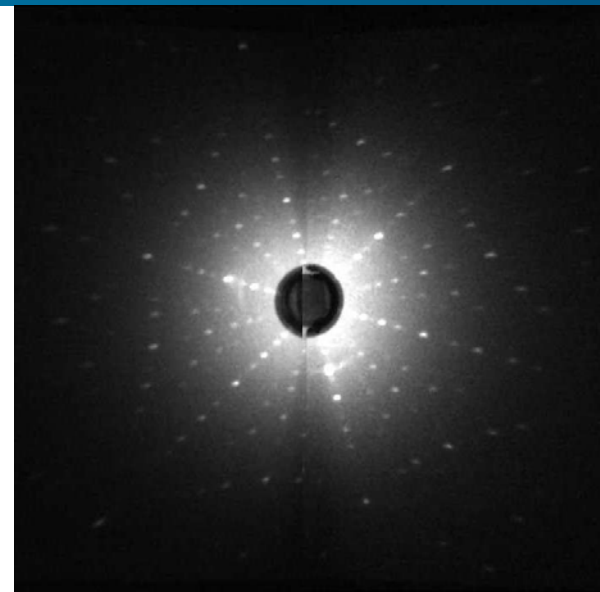


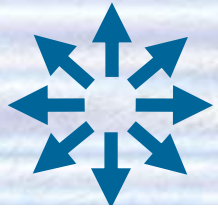
● Macro Camera for X-rays or Neutrons



2-CCD Laue Alignment Camera

- Neutron original made by Photonic Science to ILL specification
- OrientExpress: A new system for Laue neutron diffraction
B.Ouladdiaf, J.Archer, G.McIntyre, A.Hewat, D.Brau & S.York
Physica B (2006) 385–386, pp 1052–1054
- Inexpensive Twin CCD Laue Camera by NeutronOptics





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Hi-res Neutron or X-ray Camera

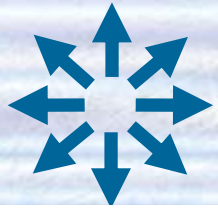
Neutron Scintillator: RC-Tritec high resolution Li6F/ZnS

X-ray Scintillator: CAWO OG-16 fastest x-ray scintillator

Optics: Nikkor 50mm f/1.2, the brightest FX Nikon lens

Inexpensive Artemis CCD: Interline Kodak KAI04022

- Cooling: 2-stage regulated Peltier with max $\Delta T = -40^{\circ}\text{C}$
- Chip size: 15.15×15.15 mm (Type 4/3")
- Resolution: 2048x2048 readout 6 seconds for 16-bits
- Pixel Size: 7.4×7.4 μm
- Binning: from 1x1 to 8x8
- Quantum Efficiency: >55% at 500-600nm, low smear
- Dark current (<0.5 nA/cm²), excellent anti-blooming
- Full well capacity: 40,000 electrons typical
- Readout: 16 bit grey scale image, FIT format
- Readout Noise: 11 e- rms
- Readout Time: ~1s (preview) or ~6s (full 16-bit image)
- Interface USB High Speed: with 10-20m amp. cables
- Region of interest: selectable independently in X and Y
- Speed increase: proportional to region of interest
- Supplied to Algeria, Thailand, Russia and the USA



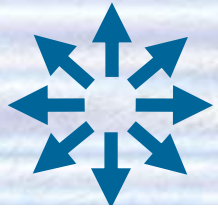
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We like your system very much because it's easy to use
& easy to capture the image" – Users at TINT Thailand
10s image on Thai Institute Nuclear Tech. 1.3MW reactor
showing an optically invisible repair of an ancient vase





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Compact Hi-res Neutron or X-ray Camera

100x100mm compact camera with nominal $\sim 50\mu$ resolution

300 kVp pulsed X-ray images, Colorado School of Mines showing a) a pair of batteries b) a valve mechanism

