Large Camera for DESY FLASH XFEL Studies

Introduction

Xcam specialises in producing custom and prototype CCD cameras for leading-edge science experiments all over the world. In June 2008, XCAM was asked to design and produce a large area CCD camera for FLASH beam-time in October 2008.

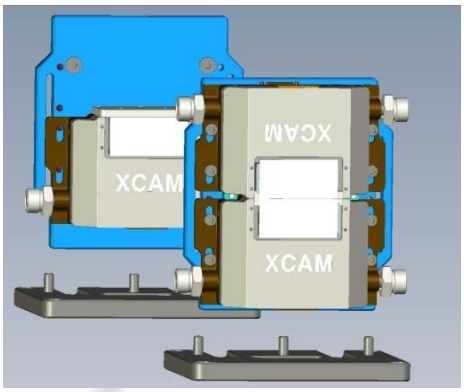


Figure 1:

3 Camera units shown in the configuration that was designed for the DESY FLASH experiments

Total number of 15 micron pixels for the dual camera is 4096 x 4096

Total image area: 61.4mm x 61.4mm

Multiple Camera Combinations

The design of the camera permits use in a number of configurations, such as the one shown above which is suitable for SAXS/WAXS type diffraction studies, where both small and wide angle diffraction detail needs to be captured.

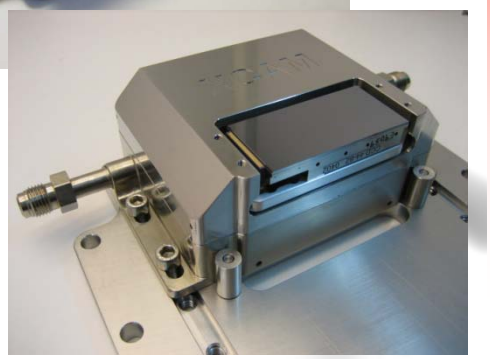


Figure 2

(Above) Single unit Camera and (right) XCAM single unit on base plate in foreground with sensor exposed to view

Extended Dynamic Range

Systems offered provide novel techniques that offer dynamic range extension resulting in *single photon detection* in outer part of image combined with *full-well capability* in centre regions of image.

Slit Separation and Adjustment

The front dual camera is on a base plate with an adjustable slit: minimum slit width is 300 microns, maximum slit width is user-definable Distance from edge of image area to edge of CCD package is 300 microns for each CCD

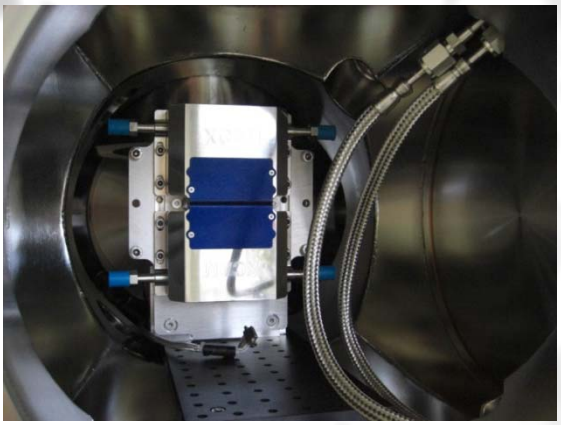
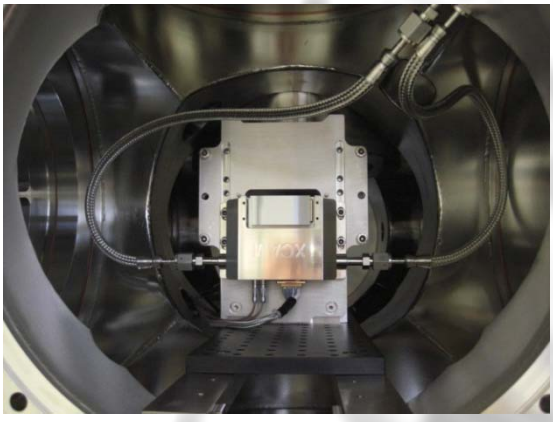


Figure 3: Showing dual camera unit being commissioned with (above) blue finger plates which protect CCDs until required, and (below) single unit camera being tested individually



Direct Detection from 100eV to 20keV

Multi-Synchronisation sequencer cards permit multiple CCDs to be operated in synchronisation for low noise performance.

Multiple CCD camera systems operated with a single PC through XCAM software., or capability for users to develop their own software calling XCAM dlls.

Software/Hardware Triggering to start Erase and Integration sequences, for synchronisation with experiment. Custom triggering schemes .

See www. For presentation of results obtained by Henry Chapman's group with XCAM camera at FLASH see http://www.newlightsource.org/cambridge.html

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