TITLE: Developments of the fast valve system used on the Diamond Light Source

Presented by: Hugo Shiers from Diamond Light Source & Neil Peacock from MKS Instruments.

The 3 GeV 562 m circumference electron storage ring at Diamond Light Source operates at a pressure in the mid 10^{-10} mbar range. To protect the storage ring from vacuum incidents the VAT fast valve system is incorporated into each front end between the beamline and storage ring. The VAT fast valve and control system uses its own dedicated gauges and electronics to provide this projection. To reduce the equipment used on each front end a system has been developed which uses the standard UHV gauging on Diamond to provide the response to trigger the fast valve. For this new system, an opto-isolated analogue signal from the newly introduced 937b MKS Instrument gauge controller is used to provide the trigger signal. This gauge output is a pure analogue signal, with response times in the milliseconds at pressures of 10^{-5} mbar. The newly developed system provides not only a cost saving but also a reduction in rack equipment and machine equipment. An additional benefit can be seen in retro fitting a fast valve in an existing place as we are able to use existing generic gauging which reduces cables being pulled and rack modifications.

This presentation describes the development and testing of the equipment which then allowed us to fit this solution to new sections of Diamond. Also a fast mask radiation protection system of the triggered fast valves will be described.