ANDOR™
TECHNOLOGY

Manual

VERY IMPORTANT INFORMATION!
READ BEFORE UNPACKING YOUR SYSTEM!

This Manual is an Addendum to the standard manual and should not be used in isolation

X-Ray Systems

SO / SX / SY / HO / HX / HY Systems

Exposure levels

A scientific CCD is an extremely sensitive electronic detector in the X-ray / XUV region. Exposure to high incident fluxes or high energies photons will result in permanent damage to the device. Exposure levels must be maintained below the saturation level of the detector and all care should be taken to avoid unnecesscary exposure. Exposure levels

In order to calculate the level of saturation assuming direct detection, the fact that an absorbed photon of energy E will produce approximately E/3.65 photoelectrons, which can be converted into counts by using the sensitivity setting of the camera.

No. of P/electrons=E/3.65

No.Counts= E/3.65*Gain

E/3.65*Gain for the standard gain setting of 7 electrons / count would give E/25.55.

For example, a 1keV photon which is absorbed in the CCD will generate ~275 photoelectrons or ~39.3 counts.

Therefore 65,000/39.3 or ~1650 such photons can be absorbed per pixel before saturation is reached.

No. of P/electrons=E/3.65

No.Counts= E/3.65*Gain

The most common causes of damage to Open Front systems are:

- accidental exposure to high fluxes of photons, through poor baffling of the detector and/or insufficient or damaged filtering
- Mishandling causing accidental damage to the CCD surface through inadequate precautions being taken when front plate is removed.

The bare silicon surface, or the detection surface, of your CCD is exposed when you remove the blanking plate from the front of your system. Damage can easily occur at this time. Please take all appropriate precautions!

IF YOUR SYSTEM HAS A BERYLLIUM WINDOW PLEASE NOTE THE FOLLOWING WARNINGS:

Beryllium is extremely brittle - avoid mechanical shock to the camera as this may cause the window to be broken or shatter. Beryllium particles presents a potential cancer hazard. Overexposure to beryllium by inhalation may cause chronic beryllium disease, a serious chronic lung disorder. This risk is only present when the window has been damaged or broken. An intact window does not present a risk. If damage occurs contact Andor immediatedly for advice. Contact Andor for further information if required.

Cooling of the CCD

A multi stage thermoelectric cooler is built into the detector head. It is used to cool the CCD in order to achieve optimum performance. The temperature setting is controlled through the software. The ultimate temperature to which the CCD can be cooled is critically dependent on the vacuum pressure.

SX/HX detector heads are passively cooled and incorporate a copper heatsink with tapped holes (protruding through the sides) for coupling to other components within your vacuum system.

In all cases where the CCD is cooled below the condensation point, THE USER MUST ENSURE THAT THE VACUUM ENVIRONMENT IS FREE OF WATER VAPOUR AND OTHER CONTAMINANTS. Substances such as water or oil condensing on the sensor will rapidly freeze and permanent damage may occur to the surface or the delicate bond wires.

Vacuum Compatibility

This SX/HX detector housing is designed for installation within your vacuum chamber. It has been tested to pressures of <10-5 torr and has been found to have minimal effects on both pumpdown time and ultimate pressure reached. Electrical connection between the head and controller card is made using both the supplied cables and vacuum feedthru flange, which incorporates a vacuum compatible electrical feedthru.

The SO/HO detector is designed to be coupled to a port on your vacuum chamber. The minimum achievable pressure will depend on the coupling mechanism employed: O ring based systems are suitable for pressures >10-6 torr whereas metal sealed systems are suitable for UHV applications, down to pressures of ~10-7 torr.

The maximum bakeout temperature for all SO / SX systems is +55ºC.