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National Centre for Synchrotron Science



Ansto

Australian Synchrotron

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## High Data Rate MX at the Australian Synchrotron.

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The advent of the Eiger family of detectors has pushed the speed of MX experiments to new heights with SAD phasing datasets being collected in as little as 1 second. The Eiger16M can produce 10Tb of data per day at a bandwidth of 40Gb/s. These high data rates come with a range of benefits and challenges for synchrotron facilities. With an Eiger 16M detector scheduled for delivery in December 2016 the MX2 beamline needs to be ready to meet these challenges. The requirements for beam and crystal stability, robot speed, network bandwidth, fast processing and storage will be discussed and the Australian Synchrotron's plan to deal with these requirements. The likely improvements in data quality and collection speed will be significant, changing the way the MX2 beamline is used. Due to the high frame rate (133Hz full frame and 750Hz for 4M mode) significant high-frequency fluctuations in beam position and/or intensity can have an adverse effect on data quality. The measures being undertaken to characterise the current beam motion and upgrades to the MX2 optics (such as the MHFM mirror) will be discussed.

From international experience beamlines upgrading from CCD to pixel-array detectors can experience issues where users are unfamiliar with the new detectors. As Eiger frames will look radically different to CCD images the "rule-of-eye" can no longer be used as a solid judge of crystal quality. Data representations from hundreds of summed frames may be required to produce a single CCD-equivalent image for visualisation. Tools for the graphical representation of Eiger data in a user-friendly manner are being developed. Finally, the planned collection modes and user automation will be presented.

The Eiger16M detector can transform the capabilities of the MX2 beamline but requires a parallel transformation in the other beamline components so that it can deliver the maximum benefit to the user community.

### Keywords or phrases (comma separated)

#### Are you a student?

No

#### Do you wish to take part in the Student Poster Slam?

No

#### Are you an ECR? (<5 yrs since PhD/Masters)

No

#### What is your gender?

Male

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