[MS12-P04] Diffraction data collection with a dynamically variable beam size. Danny Axford[a], Robin Owen[a] and Gwyndaf Evans[a].

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During a diffraction experiment, in order to ensure the maximum signal-to-noise, it is essential that the X-ray beam cross-section matches as closely as possible the dimensions of the crystal cross-section. For small and weakly diffracting crystals of macromolecules the requirement for optimum signal-to-noise becomes crucial. This issue is exacerbated when crystals grow into highly anisotropic shapes such as needles or plates. In such cases where sample cross-section and diffracting volume change on rotation, a variable beam size has been shown to be beneficial in challenging cases of structure solution [1].
In order to exploit these findings we have constructed a device to allow a rapid tailoring of the beam to match the demands of the sample during an experiment. Using an arrangement of four independent beam-defining blades, operating with millisecond response piezo-actuation, the X-ray beam can be dynamically shaped during a rotation experiment. Beam trimming takes place within 15mm of the sample to minimise beam convergence effects, yet since device resides within the 'blind-spot' of the sample viewing optic, visualization of the sample remains unaffected during operation.
Results illustrate how the device can improve measures of diffraction data quality by optimizing beam size during an experiment where a changing sample cross-section is observed.

1. Hausmann, J., et al., *Mammalian cell expression, purification, crystallization and microcrystal data collection of autotaxin/ ENPP2, a secreted mammalian glycoprotein.* Acta Crystallographica Section F-Structural Biology and Crystallization Communications, 2010. **66**: p. 1130-1135.

Keywords: Macromolecular Crystallography, instrumentation, microcrystals