Oral Contributions

[MS12] Radiation Damage
Co-Chairs: Max Nanao (FR), Arwen Pearson (UK)

[MS12-01] More haste and more speed: outrunning damage in room temperature MX
Robin L. Owen, Neil Paterson, Danny Axford, Gwyndaf Evans

Diamond Light Source, Harwell Science and Innovation Campus, Didcot, OX11 0DE, UK
e-mail robin.owen@diamond.ac.uk

The clear mitigation of radiation damage achieved through the cooling of samples to 100K means that cryogenic data collection has become the norm in macromolecular crystallography. Despite this, room temperature data collection remains an important tool both for screening of crystals and identification of optimal crystallisation conditions, and for collection of data for structure solution [1]. The seemingly inevitable rapid onset of radiation damage means, however, that the amount of data that can be collected from each crystal is severely limited. This limitation imposes the need for a large number of (isomorphous and well-diffracting) crystals for structure solution and can make subsequent steps in the structure solution pipeline such as data integration, scaling and phasing extremely challenging. Recent experiments revealed a systematic increase in the room temperature lifetime of protein and virus crystals through use of a highly brilliant X-ray beam and reduced exposure times [2]. More recent work, carried out with improved instrumentation, has however revealed a more complex picture than a simple dose-rate effect. In contrast to previous observations of a simple exponential or linear fall-off in the diffracting power of crystals, a more complex form of decay is observed. The form of this decay truly raises the possibility of collecting complete datasets from room temperature microcrystals at synchrotron sources. The origins of this decay form will be discussed and a model outlining its physical origin introduced.

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2. Owen, R. L., Axford, D., Nettleship, J. E., Owens, R. J., Robinson, J. I., Morgan, A. W., Dore, A. S., Lebon, G., Tate, C. G., Fry, E. E., Ren, J., Stuart, D. I. & Evans, G. (2012). *Acta Cryst* **D68**, 810-81

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