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A Kappa diffractometer for micron sized crystals

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Despite using sub-micrometer precision spindles, diffractometers generally offer a few micrometers stability when equipped with Kappa axis. This limits the minimum affordable crystal size to a few tens micrometers. The experience gained in applications using small crystals and the increased availability of micro-focus beamlines now encourage crystallographers to use much smaller crystals. A number of micro-beam based experimental approaches may help mitigating the radiation damage as a major limiting factor [1], [2], [3]. Techniques are also developing to scan crystals with a tinny beam to find good diffracting areas, and to further collect data at the best places [4].

Supporting this type of applications will require diffractometers with sub-micrometer precision. Moreover, the use of kappa goniometers could be essential to pre-orient micro-crystals in order to minimise radiation damage and to optimise collection of complete data sets over several micro-crystals.

Gravity was found to significantly impact on the stability of centring tables and kappa mechanism associated with Omega spindles set horizontally, thus resulting in poor stability at crystal position. A new Kappa diffractometer equipped with an air bearing goniometer set vertically is currently under development. We expect the precision to be around 0.3 micrometer for Omega, and the stability better than a micrometer with Kappa. Including all the features present in the most advanced micro-diffractometers, the new device should be suitable for processing micrometer sized crystals. The plans are to equip the EMBL@PETRA3 MX2 beamline in 2012, and to further upgrade the ESRF ID23-2 micro-focus beamline.

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DW varimax rapid II: one source, two wavelengths, power and flexibility

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The drive towards comprehensively equipped analytical facilities, is both an economic necessity and a big opportunity for interdisciplinary research; there is a stringent need for manufactures to provide new tools, optimised for this scenario.

DW Varimax is a confocal, high flux, optics system capable of switching between a range of exchangeable radiations and designed to work with a high-flux source with dual target. The power and flexibility of such source is an ideal match for our Rapid II IP detectors, capable of exploiting its key capabilities.

A wide range of selected advanced applications will be presented, demonstrating the diverse specialist applications for which this machine is optimised.

Keywords: charge density, microdiffraction, protein