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New Optics for Molecular Macromolecular Crystallography. Kris F. Tesh¹, Angela Criswell¹, Licai Jiang², Bret Simpson¹, Boris Verman², Cheng Yang¹, Joseph D. Ferrara¹, ¹Rigaku Americas Corp., 9009 New Trails Dr. The Woodlands, TX 77381, ²Rigaku Innovative Technologies, 1900 Taylor Road, Auburn Hills, MI, 48326.

We have developed two new VariMax™ optics for macromolecular crystallography, one for screening very small samples and the other for easy switchover between Cr and Cu radiation.

It is well known that automated crystallization methods produce smaller crystals. In order to provide for better screening of initial hits for further optimization of crystallization conditions, better screening for subsequent data collection at synchrotrons or even rapid data collection at home, we have developed a very high flux optic, the VariMax-VHF [US Pat. No.: 7,245,699]. This new optic provides a beam of 100 μ m FWHM focused at the sample with up to 3.5 fold more flux at 100 μ m than conventional optics when coupled to a microfocus rotating anode source [US Pat. No. 6,823,042]. These enhanced properties of the beam provide for easier analysis of small crystals and faster screening of routine samples.

Additionally, now that SAD techniques have surpassed MAD as the primary method for structure solution, we have developed the VariMax-DW, [US Pat. No.: 6,014,423], a revolutionary dual-wavelength optic. This optic is designed to allow for easy switchover between chromium and copper radiation with only minor realignment of the optics path. It is accomplished by providing two sets of optical surfaces (one for each wavelength) and one slit to choose the desired wavelength.

In this paper we will present results on the efficacy of both optics for macromolecular crystallography applications.