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A Comparison of the Measurement of Protein Solutions on a MetalJet Equipped Laboratory SAXS Instrument and a Synchrotron Beamline

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SFPQ is a protein that suppresses tumours in humans. Two samples were prepared from the same batch and frozen until just prior to measurement. Traditionally the investigation of protein solutions has been limited to synchrotron facilities, though more recently instruments making use of microfocus rotating anodes have allowed more measurements to be made in the laboratory. One sample was measured on a Bruker AXS Nanostar using the MetalJet X-Ray source from Excillum, the latest generation of x-ray generators for laboratories. The MetalJet X-Ray source makes use of a pressurised liquid metal anode capable of withstanding a high power electron beam and the resulting x-ray beam is much brighter than conventional sources. The SAXS instrument was further equipped with long Montel multilayer mirrors and home-built “scatterless” slits. While rotating anode sources often require at least 30 minutes of collection time for scattering curves from weakly scattering biomolecular solutions the MetalJet data presented here were collected in 1 minute. While this is still significantly longer than what is required at synchrotron facilities it represents a major improvement on current generation laboratory instruments. The new SAXS facilities in Western Australia will provide the user community with access to a larger range of experiments and also help in generating preliminary data for experiments that specifically require synchrotron access.

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