Spectroscopy provides a source of high intensity, highly collimated, wavelength tunable X-radiation which is becoming increasingly important in studies of structure-function relationships in biological macromolecules. At a fixed wavelength, the high intensity and low beam divergence enable diffraction patterns from crystals with large unit cells to be resolved. The use of shorter wavelengths can lead to a reduction in radiation damage as well as minimizing systematic errors due to absorption. Weakly diffracting samples and small crystals often give useful data not obtainable from conventional sources. The wavelength tunability can also be used to optimise anomalous dispersion effects and lead to phase determination through multi-wavelength synchrotron data. Alternatively, the high intensity of the radiation over a large part of the X-ray spectrum is well-suited to the Laue technique. The Laue technique can be applied not only to protein crystals where the interest is in rapid data collection, but also to extremely small crystals of the order of tens of microns long.

At the Synchrotron Radiation Source, SERC Daresbury Laboratory, two stations provide "state of the art" facilities for protein crystallography. Both stations derive their radiation from a 3-pole wiggler magnet operating at 5 tesla. Station 9.5 is a dual purpose station designed for focussed Laue experiments and rapidly tunable monochromatic applications including multi-wavelength anomalous dispersion measurements. The principal optical components are a platinum coated fused quartz toroidal mirror and water cooled channel cut Si(111) double crystal monochromator. The mirror has an acceptance aperture of 1.2 mrad. horizontally and 0.1 mrad. vertically giving a white beam focal spot size of 1.3 x 0.4 mm same 32 m from the source. The monochromator is to be dropped at about 30 m from the source for monochromatic work and gives a band pass $\Delta \lambda / \lambda = 0.00015$. The station is equipped with a Mar-Research image plate detector with the option of an Anrde-Wonanott camera, and X-ray film for Laue work if appropriate.

Station 9.6 is mainly used as a fixed wavelength station. The optical components are a platinum coated fused cylindrical curved quartz mirror which provides 1:1 vertical focusing and a bent triangular Si(111) monochromator giving 0.1 horizontal defocusing at 0.95 $\AA$ with a band pass $\Delta \lambda / \lambda = 0.0004$. The size of the focal spot at the specimen is 0.5 x 0.3 mm in the horizontal and vertical directions respectively. The station can be equipped with an Enraf-Nonius Fast TV detector system or an image plate device.

Most data processing mainly involves MOSFLM as modified by DR A. Leslie (Cambridge) and the CCP4 suite of programmes.