Upgrades to the B21 solution SAXS beamline

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B21 is a solution state SAXS beamline at the Diamond Light Source synchrotron in the UK. Over the past two years we have carried out a series of upgrades that have resulted in noticeable improvements in data quality and throughput.

We have:
1) Upgraded our monochromator and focussing optics resulting in a 50x increase in flux and improved focus. This upgrade has reduced average exposure times by around 12x whilst improving signal to noise.
2) Moved the silicon nitride window that separates the high vacuum of the optics from the low vacuum of the sample area further from the sample and added a set of custom slits close to the sample. This has dropped background scattering further improving signal to noise.
3) Improved software integration of our HPLC-SAXS setup and created useful tools for analysis of this kind of data.
4) Developed a successful mail-in program for remote measurement of samples at the beamline.

Here, we present details of the upgrade program and the current state of the beamline and highlight some recent science applications.