

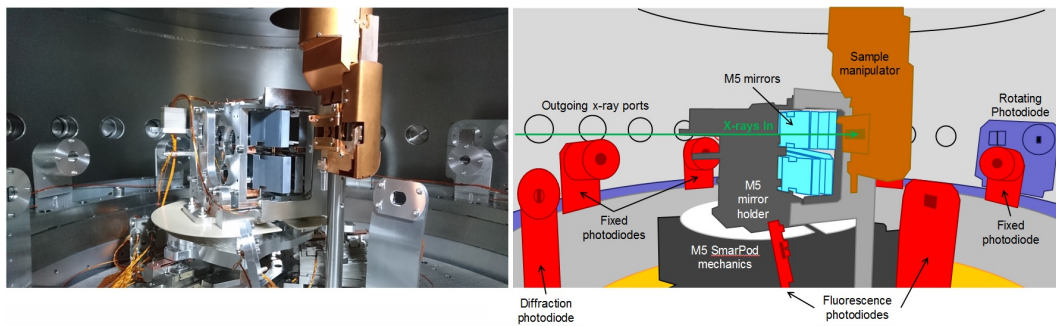
# The sample station at the I21 RIXS beamline at Diamond Light Source

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The I21 beamline is a high resolution Resonant Inelastic soft X-ray Scattering (RIXS) facility at Diamond Light Source, UK which is now in User Operation. I21 features an extremely high energy resolving power: up to 40,000 over an energy range of 250 – 1500 eV. To realise these demanding specifications, we have designed an 81 m long beamline and a 15 m long RIXS spectrometer. With such a long instrument the efficiency of the RIXS experiments could be very low, due in part to the size limitations of commercially available soft x-ray CCD detectors. To overcome the issue, the I21 spectrometer employs collection mirrors located inside the sample chamber, centred just 150 mm from the sample position. These mirrors are used to collect outgoing x-rays over a relatively large horizontal angle. In addition to this collection mirror system, the sample station also hosts a 6-axes sample manipulator with liquid helium cooling, as well as an in-vacuum rotation bearing on which a photodiode is mounted for performing specular reflectivity and diffraction measurements. In addition, the sample station will soon enable the continuous rotation of the spectrometer without breaking ultra high vacuum. In this presentation the overall design of the I21 sample station will be described, and the latest results from using this system will be reported. Our future plans for the sample station will also be outlined.



A photo of the in-vacuum components in the I21 sample chamber is presented on the left, with a cartoon-style version shown on the right with the different components labelled.