BL44B2
(RIKEN Materials Science)

BL44B2 employs the total-scattering detector system OHGI [1], which is composed of 15 independent microstrip modules (MYTHEN; Dectris). The raw data form two columns: channel number and intensity. For data analysis such as Rietveld and pair distribution function analyses, data between modules must be connected, and the channel number must be converted to the scattering angle 2θ according to the detector geometry. Taking advantage of overlapping angles in OHGI, multiple independent data can be readily connected. The channel–2θ conversion parameters (radius and center angle of each module) can be obtained using both a calibrated wavelength and a reference sample. For each X-ray energy, these parameters were incorporated into the software. The radius parameters depend on the X-ray energy since the penetration depth to the Si sensor is a function of energy. Furthermore, correction factors for X-ray response non-uniformity (XRNU), which are obtained by ReLiEf [1], were incorporated into the software. There is a table for the correction factors of every energy threshold in the detector system, which can be updated on demand since XRNU tends to be influenced by the sensor and experimental conditions as well as the threshold. Using a web-based software written by Electron (GitHub), 15 independent data were corrected, converted, and finally connected automatically (Fig. 1). The software is equipped with an optional function so that the intensity at a registered bad channel is interpolated using the neighboring channels. In microstrip and pixel detectors, the number of bad channels (pixels) increases with time.

Furthermore, the software can process multiple datasets simultaneously. For example, high-resolution measurements provide two datasets measured at different angles. Thus, the software plays a key role in processing data for structural analysis.
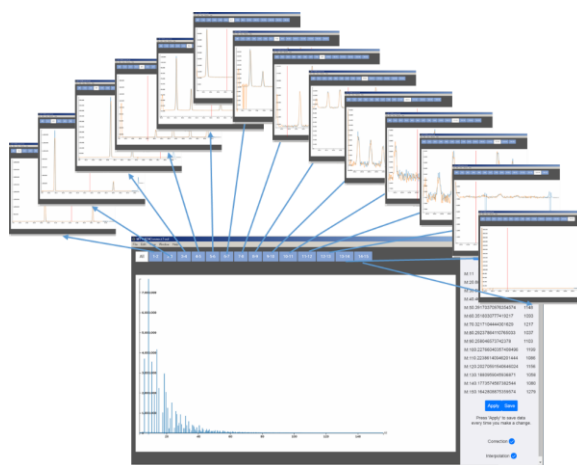

Fig. 1. Interface of the data-processing software for OHGI.

Kenichi Kato

SR Imaging Instrumentation Team, Physical and Chemical Research Infrastructure Group, Advanced Photon Technology Division, RIKEN SPring-8 Center

Reference:
[1] K. Kato et al., *J. Synchrotron Rad.* **26**, 762-773 (2019).