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Advances in X-ray Raman spectroscopy at Stanford Synchrotron Radiation Lightsource DIMOSTHENIS SOKARAS, DENNIS NORDLUND, TSU-CHIEN WENG, ROBERTO ALONSO MORI, UWE BERGMANN, SLAC National Accelerator Laboratory — We present a state-of-the-art x-ray Raman spectroscopy end-station recently developed, installed, and operated at the Stanford Synchrotron Radiation Lightsource. The end-station consists of two multicrystal Johann type spectrometers arranged on a Rowland circle of 1m. The first one, positioned at the forward scattering angles (low-q), consists of 40 diced and spherically bended Si(110) crystals of 4" of diameter providing a large solid angle of detection as well as an overall energy resolution of about 270 meV at 6462.20 eV. The second spectrometer, consisting of 14 spherically bent Si(110) crystal analyzers, is positioned at the backward scattering angles (high-q) enabling the study of non-dipole transitions. These features, in particular the improved total resolution with a substantial increase in solid angle, positions the instrumentation as a unique alternative to soft x-ray absorption for difficult sample conditions and bulk sensitive measurements, which allows a systematic implementation of this photon-in/photon-out hard x-ray technique on emerging research of multidisciplinary scientific fields in energy-related science, physics, and material science. Preliminary results and prospects will be presented and discussed, in particular for applications in Energy Science.

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