Grazing incidence in-plane x-ray diffraction (GIIXD) is used to measure the in-plane lattice parameter and mosaic spread in the near-surface region of a crystal. It is highly appropriate to the study of heteroepitaxial films with large mismatch. Fig. 1 shows an in-plane (quasi-reciprocal space) map of the scattering associated with the 220 reciprocal lattice point from a (001) SiGe graded layer grown on Si. Until recently, the technique was used almost exclusively at synchrotron sources but recent developments in high brilliance microfocus x-ray sources and novel optics now enable such measurements to be undertaken in the laboratory on commercially available instrumentation. We describe the application of laboratory-based GIIXD to the measurement of twist mosaic in GaN based epitaxial structures, the in-plane order in Langmuir-Blodgett films, the depth dependence of the in-plane lattice parameter of Si/Ge on Si and the in-plane strain in polycrystalline ZnO on glass. Use of a beam conditioning monochromator permits the technique to be undertaken under high resolution conditions (Fig. 2), thereby greatly enhancing the sensitivity to the in-plane mosaic. We examine benefits and limitations on the method in this mode.