Kβ-filters and secondary monochromators are among the most frequently used devices for X-ray beam conditioning in laboratory diffractometers. Kβ-filters are single-band bandpass devices where monochromatization is based on the K absorption edge of the employed filter material to selectively allow transmission of the Kα characteristic lines while filtering Bremsstrahlung, Kβ radiation and other characteristic lines. One major disadvantage of Kβ filters is that they introduce absorption edges at the low energy side of diffraction peaks, dependent on the wavelength as well as the filter material and its thickness. While for point detectors absorption edges are usually obscured by counting statistics, they are much more pronounced for position sensitive detectors to the high intensity data typically collected. Additionally, Kβ-filters are not suited to effectively filter fluorescent radiation. Where fluorescent radiation and absorption edges are of concern, secondary monochromators may be employed instead of Kβ-filters. Very effective monochromatization and filtering of fluorescent is achieved, however, at the expense of significant intensity losses. For a typical secondary monochromator employed with point detectors, the intensity loss is typically about 2/3 compared to unfiltered radiation. In combination with a position sensitive detector present secondary monochromators come with an intensity loss of more than 90%.

In this paper a new energy-dispersive position sensitive detector will be introduced. This detector is based on the well known silicon strip technology and thus offers the same advantages in terms of intensity gain / measurement speed as its currently available predecessors. Additionally, it effectively filters Kβ radiation and specimen fluorescent, eliminating the need for Kβ-filters or secondary monochromators. As a consequence of the high intensity obtained with this detector, lower limits of detection are greatly improved compared to any secondary monochromator based detector systems. Both, the detector technology as well as application examples will be discussed.