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Calibration of a pixel sensor using both fluorescence and transmitted X-ray photons

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Pixel sensors have been calibrated using both fluorescence X-ray photons and a narrow X-ray beam obtained by transmission technique. The X-rays were generated by a Amptek EDIX 40 X-ray tube (Maximum voltage 40 kV). During the fluorescence calibration the pixel sensor was placed in front of the target in a off-beam position, the resulting photons hitting the detector were emitted by fluorescence in all directions with an energy which is typical of the fluorescence lines of the target material. During the calibration in transmission mode the detector was placed behind the target, acting now as a filter, and the energy of the photons is tuned by adjusting the voltage of the tube and the thickness of the target. In this poster presentation the comparison between the two methods will be shown. From the results of this test, it is possible to infer that transmission is more efficient (higher photon yield) and flexible (more energy points are possible) but produces broader lines while fluorescence has a better energy definition. A reasonable strategy to benefit from both methods is using fluorescence to calibrate a spectrometer that will be used to evaluate the energy of the X-rays emitted in transmission mode. The results of this calibration will be shown in the poster.

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