2 mm Silicon Drift Detector with Improved Hard X-Ray Spectroscopy Performance

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Silicon Drift Detector (SDD) offers several advantages for their usage in X-Ray spectroscopy compared with Si(Li) detector. However, limitation of the thickness make it less competitive when detecting X-Ray fluorescence of heavy element. Recently, we have developed 2mm SDDs with 50mm^2 effective area. It shows much better Quantum Efficiency (QE) than 1mm and 0.5mm SDD when energy is over 10KeV. The QE above 60KeV is about 4 times of 0.5mm SDD. On the other hand, the new 2mm SDD has quite short rise time (~ 20ns) which also ensure an excellent performance under high count rate up to 3M cps.

The figure below shows parts of spectrum of ^{241}Am with 0.5 mm, 1 mm, and 2 mm SDDs respectively.

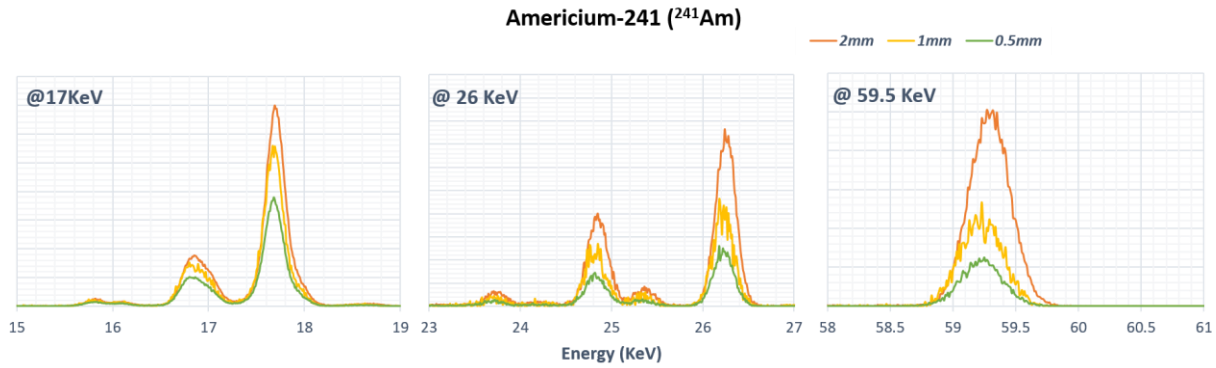

Figure 1 X-Ray spectra of ^{241}Am with 0.5mm, 1mm, 2mm SDDs respectively