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High-Density Monolithic SDD Arrays for High-throughput X-Ray Spectroscopy Applications

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Abstract

X-ray spectroscopy experiments in new-generation synchrotron beamlines require detectors with high throughput capability and excellent energy resolution.
The ARDESIA project addresses this need through the development of advanced X-ray spectrometers based on monolithic, highly segmented arrays of Silicon Drift Detectors (SDDs).
In this work, we present a comprehensive spectroscopic characterization and design advancements of ARDESIA-64, a 64-channel detector featuring a high-density monolithic SDD array. ARDESIA-64 achieves a four-fold increase in Output Count Rate (OCR) compared to its predecessor, ARDESIA-16, while preserving the same compact footprint to facilitate seamless integration into synchrotron beamlines.
The increased detector throughput enables handling of higher beam intensities, resulting in faster experiment times while maintaining energy resolution.
In addition, we will present at the conference the results from both active and mechanical collimation approaches, highlighting their impact on detector performance and background suppression.

References

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