Comparison of Increased Temperature on Timepix3 Detector with SiC vs Si Sensor

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Abstract. Hybrid pixellated radiation detectors based on Timepix3 read-out chips are widely used in a variety of fields including medicine, particle physics, neutron detection and space. The detectors are exposed to a wide range of temperatures and therefore an understanding of the behaviour of these detectors under the influence of different temperatures is necessary. This study focuses on the investigation of the temperature dependence of the Timepix3 detector equipped with a 4H-SiC sensor and subsequent comparison with the temperature dependence of the commercially known Timepix3 detector with a Si sensor. The results show that the accuracy of the detector decreases with increasing temperature, and this trend is exacerbated with increasing incident radiation energy for the Timepix3 detector with both SiC and Si sensors.

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