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Electrical Characterization of CdZnTe-based Radiation Detectors at Extreme Temperatures.[1] STEPHEN BABALOLA, JONATHAN LASSITER, ROBERT SMITH, KRISTINA WILLIAMS, KALEN MUMFORD, Alabama AM University — Cadmium Zinc Telluride has emerged as a material of choice in optoelectronic applications requiring high band-gap and high-Z materials, and has been used in several applications from radio isotopic detection at portal stations for homeland security, imaging for medical research and high-energy radiation detection in astrophysics. For this reason, CZT semiconductor crystal properties have been studied extensively with a focus on correlations of native and induced defects to the radiation detector performance. Due to the wide variety of applications, especially those requiring operations at extreme temperatures such as in Astrophysics, it is important to understand the performance at such extreme temperatures. Previous works by many researchers have shown electrical properties of heat-treated CZT crystals, however, in-situ electrical properties characterization is needed to mimic real-life applications. In this work we studied the electrical properties of CZT detectors while operating at extreme temperatures. Current-voltage measurements were obtained while the detector, placed inside of a furnace, was heated at varying temperatures. The results of this effort are presented.

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