Victoria Davis

Coastal Carolina University

2021 American Nuclear Society Virtual Student Conference

Detecting Ionizing Radiation in Space with Memristor Device

The objective of the research is to optimize a memristor device for detecting ionizing radiation in space. The memristor is a device that would allow for radiation detection through displacement damage in the device's material. The benefit to this device includes it being able to run on low power at low costs. Currently, the main focus is to test and improve the physical properties of the device. The two main methods for conducting this research have been using radiation transport simulations and actual device fabrication. This paper mainly focuses on the simulation work done in NASA's OLTARIS (On-Line Tool for the Assessment of Radiation in Space) and in EGSnrc (Electron Gamma Shower, National Research Council). These tools are used for determining the amount of dose detected in the materials of the memristor. This becomes useful in showing which material/design has the most sensitivity to respond to radiation. Between the simulations and the lab data, conclusions were drawn to show tantalum oxide had the strongest dose response making it arguably the best material out of the three that were tested for the purpose of radiation detection.