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Measurement of Effects of Long Term Ionizing Radiation on High Efficiency Solar Arrays BEN RUSSON, Utah State University, HEATHER TIPPETS, Brigham Young University - Idaho, ALEX SOUVALL, KATIE GAMAUNT, JR DENNISON, Utah State University — Degradation of power output efficiency for high-efficiency multilayer solar arrays due to ionizing radiation is measured using the Space Survivability Test chamber. Exposure to ionizing radiation disrupts the crystalline structure and can reduce solar array power output to the point that it no longer provides adequate output capacity. This can be a significant concern, particularly in the harsh environment of space where radiation dose rate is significantly higher and replacing components is often impossible. Ionizing radiation is simulated in a controlled environment to allow measurement and characterization of the power output of solar arrays, using a 100 mCi encapsulated Sr^{90} beta radiation source which produces a high energy spectrum similar to the geosynchronous space environment at more than 10X intensity for accelerated testing. The total ionizing dose is measured by a radiation sensitive diode and can be controlled by varying both the exposure time and distance to the source. Controlled temperature conditions are monitored with thermocouples. The critical measurement of power output is made through IV curves, using a standard solar light source (Class AAA Solar Simulator). IV curves can be monitored *in situ,* allowing for characterization with respect to total ionizing dose. More extensive IV response curves as a function of temperature and incident UV flux can be completed *ex situ* before and after SST exposure.

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