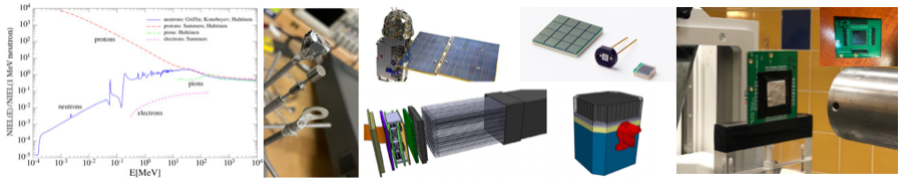

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Radiation damage assessment of commercial SiPMs

Tuesday 26 April 2022 10:15 (25 minutes)

Silicon Photomultipliers (SiPMs) are quickly replacing traditional photomultiplier tubes (PMTs) as the readout of choice for gamma-ray scintillation detectors in space. While they offer substantial size, weight and power saving, they have been shown to be susceptible to radiation damage. SiPM models from various manufacturers were irradiated with 64 MeV protons to simulate the radiation effects seen during previous space missions. The work here expands upon a previous effort with SensL SiPMs and focuses on characterizing the increase in leakage current observed with increasing radiation damage. This work was performed to better quantify this effect as a function of dose and find commercially available options that would prove more robust in the harsh radiation environment of space. In general, results show larger cell sizes are more susceptible to radiation damage with the largest showing the greatest increase in current as a function of dose for similarly designed SiPMs. Within the models tested here, two were found to be roughly an order of magnitude less susceptible to radiation damage compared to the majority of commercially available SiPMs.

Author: MITCHELL, Lee

Presenter: MITCHELL, Lee

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