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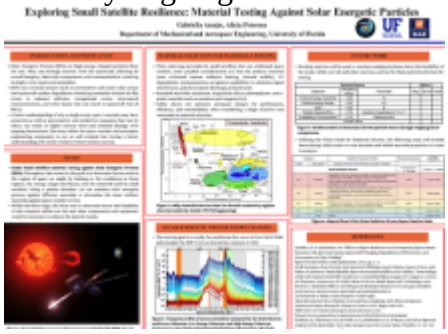
Space weather is defined as anything that can influence the performance and reliability of space-borne and ground-based technological systems from conditions on the Sun, magnetosphere, ionosphere, and thermosphere. Solar-energetic particles (SEPs) are high energy charged particles, protons and electrons, that originate from the sun. Currently, as single-event upsets, and or anomalies occur, the main focus is generally on the next necessary steps that should be taken to immediately address the issue and try to get operations back up and running. A better understanding as to why that upset occurred and preventative and predictive measures that could have been placed can result in higher success rates as well as minimal damage with ongoing particle interactions. It is currently an area within the space weather and aerospace engineering community that is not as well studied but having a better understanding of it can be crucial to future mission success. The goal of this research is to study the physical impacts of space weather, specifically with solar energetic particles (SEPs) on different materials common in small satellites to better understand what results from these interactions and how we can help minimize the impacts using different materials. Most small satellites are not designed to last and their materials have not been as well tested. Further testing would allow for satellites to be able to be designed to last longer and withstand more conditions in the space environment. In regards to material testing against space weather, very general conditions have been looked at. Testing specifically against SEP protons in a plasma chamber would allow for more accurate data with regards to a very specific scenario to allow us to better understand the impact this event truly has on different materials. The initial goal is to determine factors such as what region of space we might want to look at, the conditions in those regions, relevant fluxes and energies of SEP ground-level enhancement (GLE) events in low earth orbit (LEO), and the materials used in small satellites. This research is currently ongoing and initial results will be presented.



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