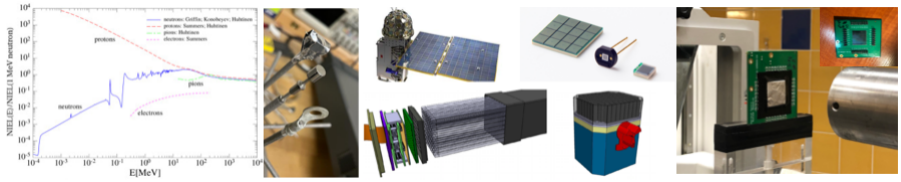

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SiPM-based Technologies for Solar and Heliospheric Science

Thursday 28 April 2022 15:00 (25 minutes)

Neutrons and γ-rays are produced throughout the heliosphere and offer a unique window to understanding the fundamental processes of energetic particles. At the Sun, because neutrons and γ rays are produced by the interaction of accelerated ions in solar eruptive events, they can further our understanding of space-weather agents, processes and effects. Neutron measurements from 20-150 MeV complement high- and low-energy solar γ-ray measurements and fill the decade-wide energy gap (30-300 MeV) in the accelerated proton spectrum at the Sun, i.e., a critical missing piece in understanding the production mechanisms of solar energetic particles. For lunar or planetary studies, broadband neutron spectroscopy (covering thermal, epithermal, and fast neutrons) and γ-ray spectroscopy can serve as an effective probe of regolith composition and in situ resource utilization, including the localization of water-ice. Furthermore, fast neutrons are a particularly hazardous form of radiation for astronauts and space assets within orbiting habitats and on lunar/planetary surfaces. We discuss the critical role of SiPM-based technology in enabling the next-generation neutron/γ-ray instruments.

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