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Carbon nanotube based photon filter for energetic particle detection[1] DAVID DEGLAU, STERGIOS PAPADAKIS, ANDREW MONICA, BRUCE ANDREWS, DONALD MITCHELL, Johns Hopkins University Applied Physics Laboratory, REDD/SD COLLABORATION — Energetic particles (EP) ejected from a plasma carry important information about the plasma physics. To study remote plasmas in the heliosphere, space-based sensors must be used. Furthermore, only energetic *neutral* atoms (ENAs) can be analyzed, since charged particle trajectories are curved by the electric and magnetic fields of the heliosphere. Because low power consumption and weight are important for spacecraft, solid-state detectors are used. The challenge with solid-state detectors is their sensitivity to light; in all observational regions of interest, photon counts are several orders of magnitude higher than ENA counts. Current state of the art solid-state detectors use ultra-thin metal or carbon films to block the photons. This sets an energy threshold for the ENAs due to the fact that the ENAs have to penetrate this film. We aim to replace the thin films with carbon nanotube (CNT) mats. The CNT mats have a much lower density while maintaining extremely high photon absorption. Thus the CNT mats will act as an excellent filter for blocking the photons while minimally affecting the ENAs of interest. We will describe the fabrication of the CNT mats and their performance characterization by optical spectroscopy and energetic particle spectroscopy using alpha particles as an ENA simulant.

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