



Investigating the Response of Carbon Nanotube-based Radiation Detectors to MeV X-rays and Electrons

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Abstract:

Our carbon nanotube (CNT) based radiation detector demonstrates numerous robust properties including radiation sensitivity, radiation damage resistance, and low power operation. The radiation sensitivity was characterized by irradiating sample devices with keV x-rays of varying energy and flux and MeV protons. Similarly, radiation damage resistance was investigated via prolonged exposure to the same types of radiation. However, the sensitivity and damage resistance of the CNT-based detector to x-ray photons of higher energy is still unknown. With the use of a clinical linear accelerator, the device response to both MeV x-rays and electrons will be investigated. As the x-ray energy increases, the interaction probability of x-rays decreases and therefore, the detector response will not be simply proportional to energy. With this consideration in mind, an electronic buildup material will be placed directly in front of the detector to optimize the device response.