

Abstract Submitted  
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**Applications of Silicon Photomultipliers, from Particle to Biomedical Physics** ALEJANDRO RAMIREZ, University of Houston, XINRAN LI, Princeton University — Silicon Photomultipliers are semiconducting devices that can operate at low voltages in low light situations with high sensitivity, and high gain without magnetic interference. They have the potential for high timing resolution, high signal to noise ratio and >40% Photon Detection Efficiency. While they have their flaws, these devices are becoming popular and are being used in today's experiments. DarkSide 20k is a planned underground dark matter detector that aims to detect Weakly Interacting Massive Particles (WIMPs) where SiPMs grouped onto a 50 X 50mm<sup>2</sup> area will detect photons from WIMP interactions with liquid argon. However recent testing shows this SiPM configuration creates a 50pF/mm<sup>2</sup> capacitance which adds noise to the readout. SiPMs are also being used with the planned 3D $\pi$  Detector. 3D $\pi$  is a full body Positron Emission Tomography scanner (PET) that uses the time of flight of annihilation photons to increase the resolution of PET imaging, reduce dosage inoculated to patients, and exposure time. A pair of simulations, one at Princeton and the other at the University of Houston, noted that we can achieve a timing resolution of 40ps. More results of these simulations will be presented.

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