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## **(G\*) POS-J92 – Analyzing the behavior of a Candidate SiPM and Signal Amplifier for MATHUSLA**

*Wednesday, 9 June 2021 14:09 (2 minutes)*

MATHUSLA (MAssive Timing Hodoscope for Ultra-Stable neutral pArticles) is a long-lived particle (LLP) detector which would be constructed on the surface above CMS and is currently in its planning stages. This large-area detector would be composed of several layers of solid plastic scintillator, with wavelength-shifting fibers connected to silicon photomultipliers (SiPMs), allowing us to monitor an empty air-filled decay volume. The purpose of this research is to examine the behavior of a candidate SiPM and signal amplifier for this detection array. The SiPM in question is the SensL MicroFB-30035 and the amplifier is the Broadcom AFBR-S4E001. This goal was accomplished by simulating these components in Ngspice, an electronic circuit simulator. Using this simulation method, we were able to measure the amplified signal output and produce voltage-time plots for it. We will next build this setup in the lab and compare our results to other candidate SiPMs. This research will be useful in developing other aspects of the detection array, the triggering system, and the readout system.

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