Abstract Submitted
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SiPM Array Calibration[1] RYAN ENOKI[2], California State University Stanisalus — The presence of high rates of fast neutrons is indicative of the presence of special nuclear material. The ability to identify and localize sources of fast neutrons from the dominant gamma background is a necessary step in securing borders, ports of entry and treaty verification. Neutron detection using liquid scintillators to act as a neutron scattering camera has been successful. This method allows for precise energy characterization and omnidirectional imaging however, they are not designed to be portable or fast acting. Using silicon photomultipliers (SiPM) with plastic scintillators to detect free neutrons allows for a compact device with very fast timing. This proposed device could identify the position and fluency rate of high energy free neutrons in environments such as ports and borders while remaining portable, rugged, and easily deployable. A critical step in the process of designing and implementing this proposed device involves calibration of the SiPM cells. Complex analog electronics used to perform pulse shape discrimination (PSD) on the output of the SiPM array require a high level of gain uniformity across all 64 cells of the array. Over the summer of 2019, initial calibration of a 64 channel Sensl SiPM array reduced the maximum deviation between channels by 78.97%. Improved gain uniformity now allows for the testing of an analog PSD circuit.

[1]uc leads
[2]This project is a Department of Energy project. Research was conducted at UC Davis over the summer of 2019.

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