



Contribution ID: 153

Type: not specified

## Towards scalable fast-neutron and reactor-antineutrino detectors based on $^6\text{Li}$ -doped PSD plastic scintillators and SiPM arrays

*Thursday, 18 March 2021 15:00 (20 minutes)*

At the previous CPAD workshop (Madison, 2019), we presented observation of Pulse-Shape Discrimination (PSD) in segmented plastic scintillator developed at LLNL instrumented with modern photosensors – silicon-photomultiplier arrays.

This talk discusses the progress of various experimental efforts we have pursued for several potential applications of such detectors, ranging from nuclear non-proliferation to fundamental science of elementary particles. The current bottleneck in constructing finely-segmented low-power detectors instrumented with SiPM arrays is the readout electronics, as there are not many off-the-shelf scalable options. One promising solution is low-cost electronics for large-channel count readout as used in the Positron-Emission-Tomography (PET) scanners. The challenge arises in achieving the PSD in such system, as the electronics are not designed to store full waveforms – only charge and timestamp for a given integration window are recorded. The PSD in such systems is likely to be inferior to the full-waveform readouts. This talk is to discuss these challenges and to draw attention of the community to several key technological bottlenecks.

LLNL-ABS-819831. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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**Session Classification:** Readout and ASIC

**Track Classification:** Readout & ASICs