

## SBN Progress – January 2019

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### I. SBND PDS System Test

A complete system test of the SBND Photon Detection System (PDS) was performed in December at the LANL Lujan Facility. Figure 1 shows the 120 8-inch detector PMTs that are mounted on a support frame, where 96 PMTs are coated with TPB and 24 PMTs are uncoated. The space between PMTs is covered by TPB-coated foils that increase the amount of light collected to approximately 1 photoelectron per keV of deposited electron energy. Outside of the support frame, there are 28 veto PMTs, corresponding to 5 8-inch PMTs and 23 1-inch PMTs. Figure 2 shows the support frame being inserted into the existing 10-ton CAPTAIN cryostat, while Figure 3 shows CAPTAIN data being collected with the Lujan proton intensity at  $100\ \mu\text{A}$  and with CAPTAIN filled with 10-tons of liquid Ar and located about 20m from the beam dump. Figure 4 shows the detector PMT traces from a candidate  $^{39}\text{Ar}$  beta decay. The upper left plot shows that there is no veto PMT activity, while the other nine plots show the prompt singlet light and some delayed triplet photons from approximately 14 PMTs per plot. The data collected are now being analyzed and will provide important results regarding liquid argon scintillation light.



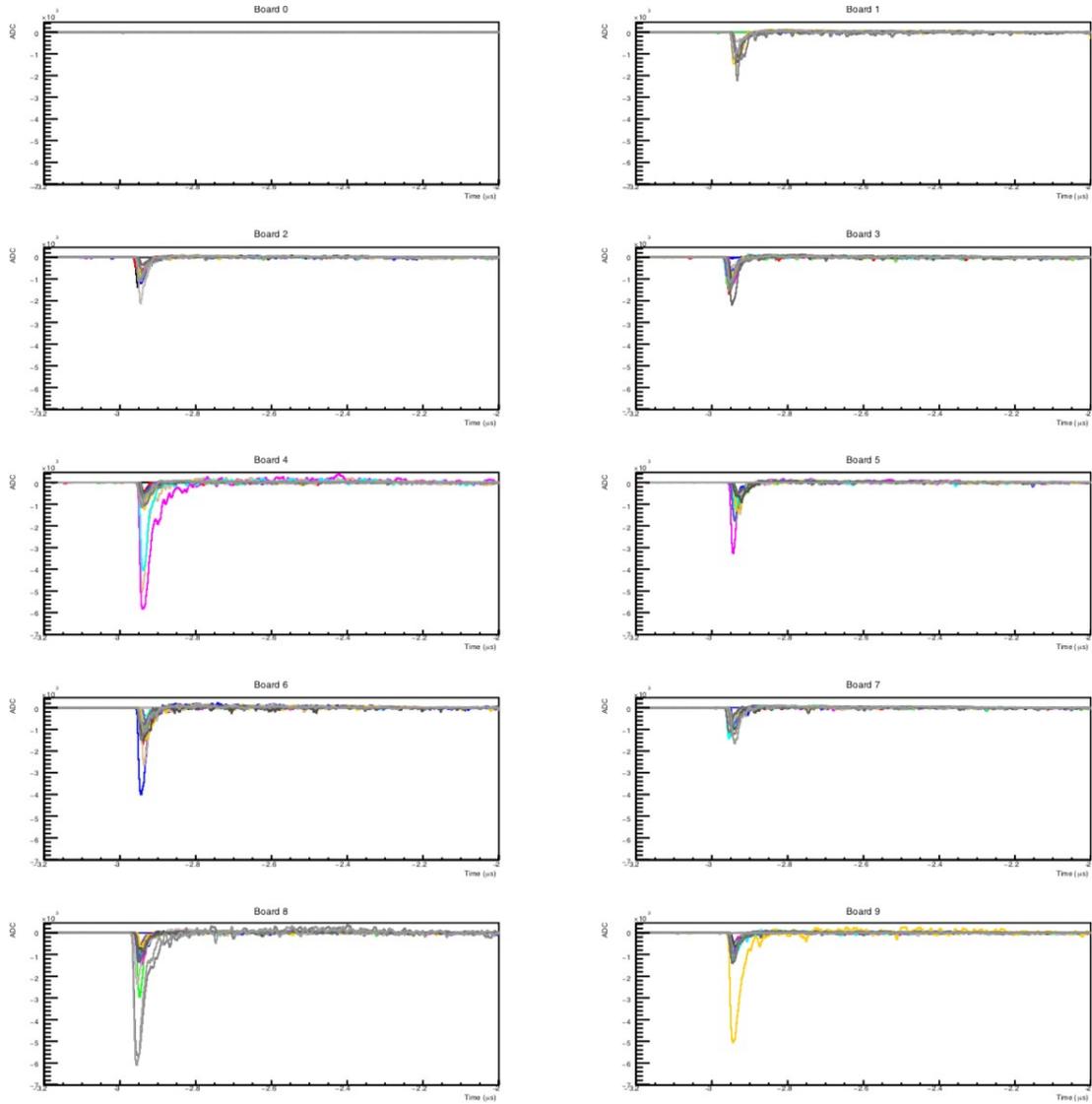
*Figure 1: A photograph of the 120 8-inch detector PMTs that are mounted on a support frame.*



*Figure 2: A photograph of the support frame being inserted into the existing 10-ton CAPTAIN cryostat.*



*Figure 3: A photograph of CAPTAIN data being collected with the Lujan proton intensity at  $100 \mu\text{A}$  and with CAPTAIN filled with 10-tons of liquid Ar and located approximately 20m from the beam dump.*



*Figure 4: The traces for ten of the detector PMTs from a candidate  $^{39}\text{Ar}$  beta decay. The upper left plot shows that there is no veto PMT activity, while the other nine plots show the prompt singlet light and some delayed triplet photons from approximately 14 PMTs per plot.*