

INTENSE ACTIVITY

REPORT OF

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Intense Meeting

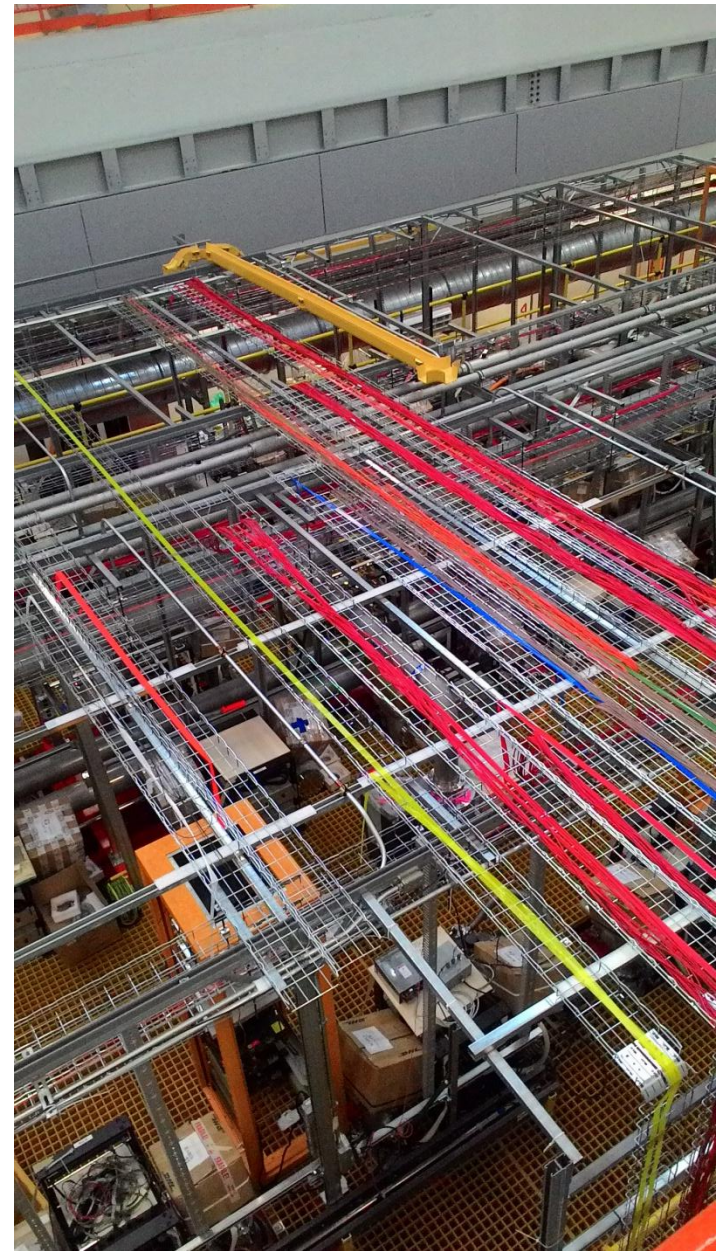
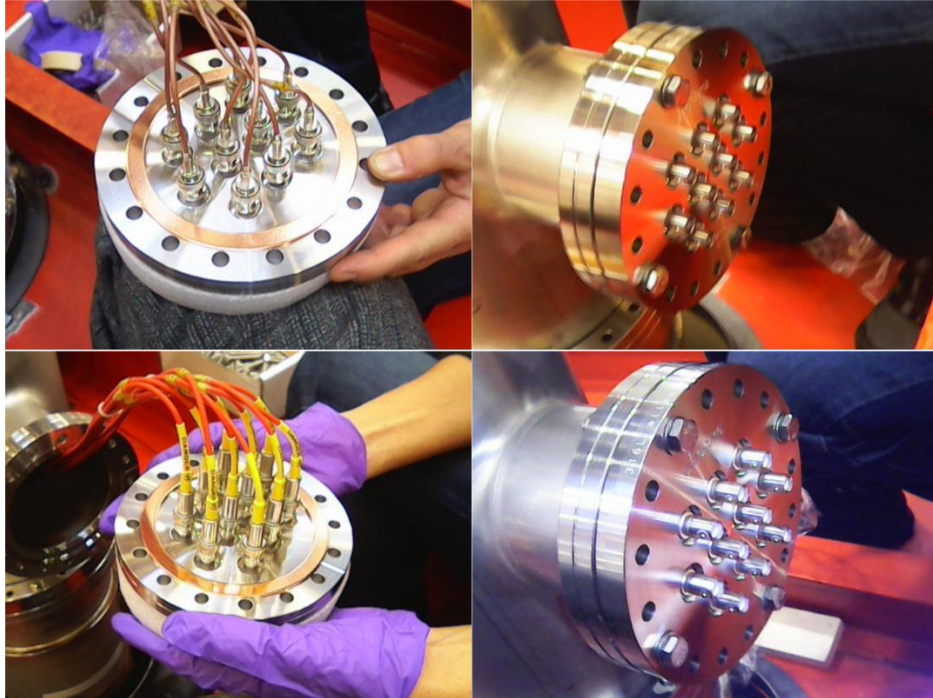
06-Nov-2019

Intense Activities Outline

- All the 2019 activities have been carried out in the framework of the WP 1 Neutrino Detectors and in particular in the installation of the ICARUS at Fermilab in the SBN program.
- Description of work:
 - Installation of signal and HV flanges of PMT system;
 - Deployment of signal and HV cables of PMT system;
 - Implementation of ICARUS PMT DAQ electronics;
 - Test of ICARUS PMT DAQ electronics and preliminary PMT analysis.
- Total secondments benefit in 2019: 3 month

PMT Cables and Flanges Installation

- The PMT flanges installation involved 72 chimneys/crosses, installed with all the necessary flanges from Dec. 2018 to Feb. 2019.
- Installation of PMT cables (HV and signal) started on Sep. 2019: work is proceeding in these days.



Installation of PMT Electronics

- PMT HV and Digital racks are being instrumented with electronics;
- Operation Readiness Clearance is in approval by FNAL authorities;
- A Vertical Slice Test (PMT-VST) is in operation in order to record PMT signal for some units with the final electronic set-up (long PMT cables and V1730 digitizers)

Two PMT HV racks have been assembled with:

- ✓ One Primary Bertan power supply.
- ✓ One CAEN SY1527 with 4 A1932AN HV distributors.
- ✓ 4 R648 SHV adapters.
- ✓ One AC switch.
- ✓ Slow control system.



4 PMT DIG racks have been assembled with:

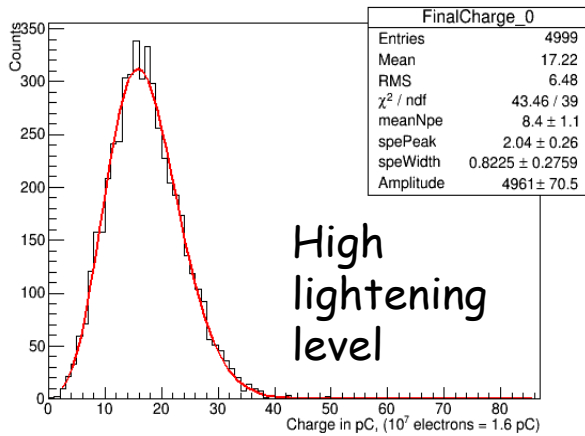
- ✓ Two VME Crates.
- ✓ 6 CAEN V1730B digitizer.
- ✓ External clock distribution system.
- ✓ One AC switch.

One digitizer completed with optical readout link for Vertical Slice Test VST.



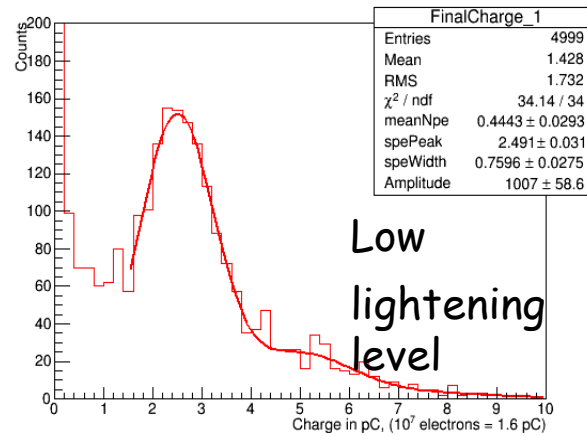
Some Tests Results

Gain results: extracted from fitting charge distributions



High lightning level

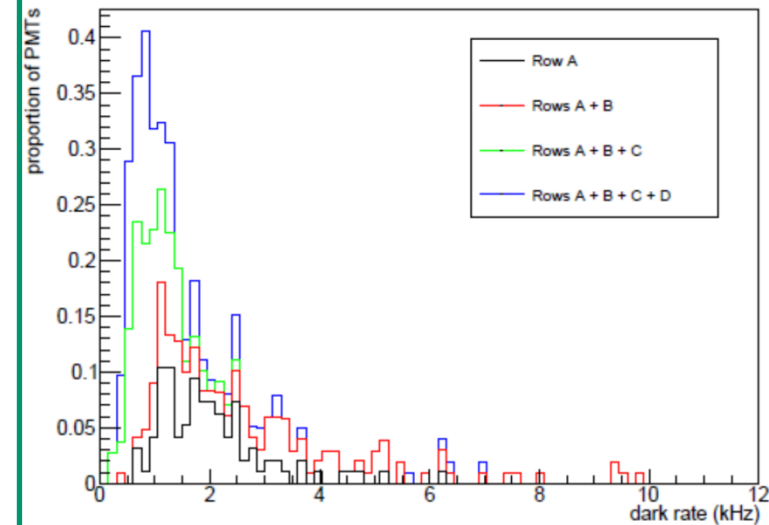
PMT A18C1, 1460V
Gain: 1.28×10^7 . (mean p.e.: 8)



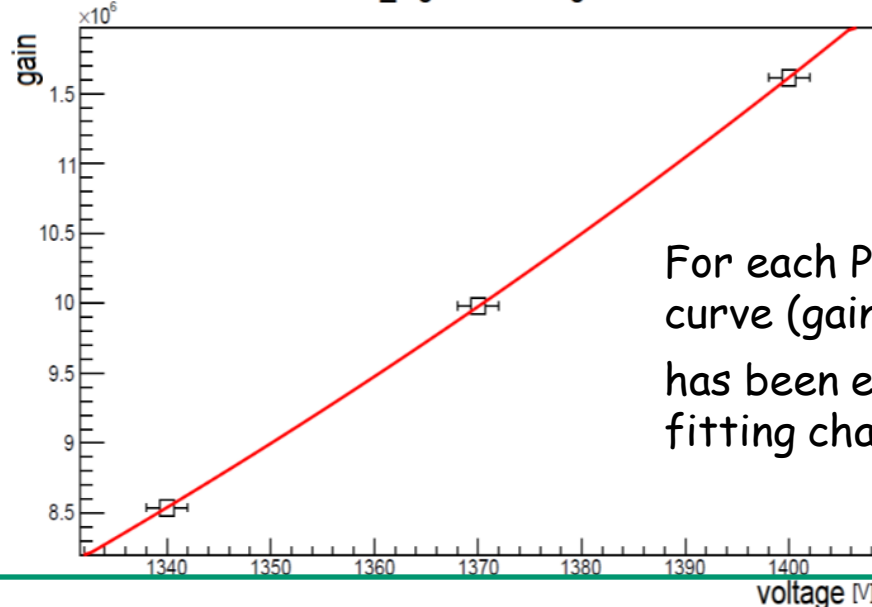
Low lightning level

PMT A18C2, 1420V
Gain: 1.56×10^7 (SER spectrum)

Dark rates (high voltage)

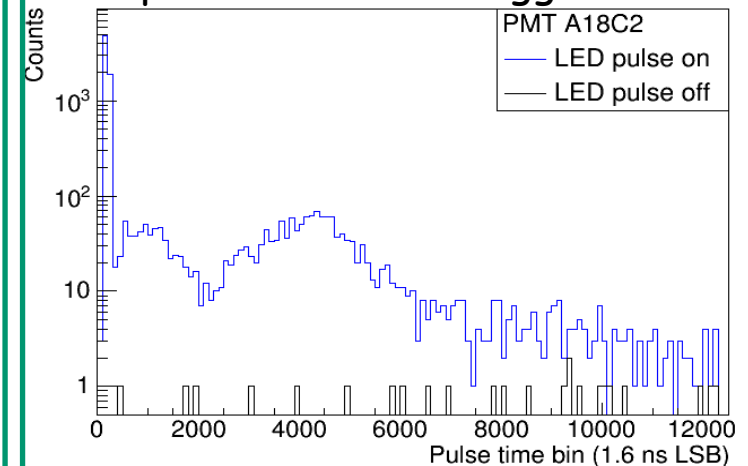


PMT C10_1 gain vs voltage



For each PMT a calibration curve (gain vs voltage) has been evaluated from fitting charge distributions

Presence of afterpulses of two types, $\sim 1.6\mu\text{s}$ and $\sim 7\mu\text{s}$ after the main pulse from LED trigger.



Thank You