

# Q8: Interface to DDSS [DUNE Detector Safety System]

- Describe the interface, or if there is not a direct interface describe how the system safety operates for the PDS

***DAPHNE will not have an Ethercat connection to DDSS. We will likely add a klixon at the 48V input to DAPHNE that will disable the 48V if the DAPHNE module gets too hot.***

***SiPM bias voltage and 3.3V power for PDS cold electronics (delivered by DAPHNE) is controlled by software as part of CCM. SiPM bias current can be monitored (under software control) and commands issued to DAPHNE to adjust SiPM bias voltage. This can be done in the context of the slow control system or CCM.***

***The self-triggering algorithm is not yet fully developed, but it will need to include provision for what to do if the trigger rate exceeds the maximum output rate of DAPHNE. This could include modifying the SiPM bias or the trigger threshold for a hot channel.***

# Q11: DAPHNE\_V2A vs. DAPHNE\_V3

- i. Plan to incorporate into design documents prior to PRR?  
***Yes; the new design will be documented in EDMS before the PRR for DAPHNE.***
- ii. What tests need to be done to validate? Please provide document summary.  
***See next slide***
- iii. Describe tests done to validate self-triggering performance.  
***See next slide.***

# Tests required to validate DAPHNE

- Normal QC tests verify hardware
- Analog function has been/will be validated using Xarapuca supercells in LN2 and/or in liquid argon, as well as in protoDUNE-II. Measurements include:
  - SiPM bias & current monitoring
  - Random noise and baseline stability
  - Correlated noise and crosstalk
  - Single PE response; S/N ratio
  - Dynamic range
  - Linearity (using light pulser)
- Digital function has been/will be validated in bench tests and at NP04/NP02
  - Streaming readout
    - Data integrity & time stamp synchronization.
  - Self-triggered readout
    - Algorithms are/will be tested using spy buffers as well as with simulated data.
    - Rate and pulse height spectra will be compared to data taken with streaming mode.
    - Large pulses will be verified by comparing output of channels corresponding to nearby supercells.