

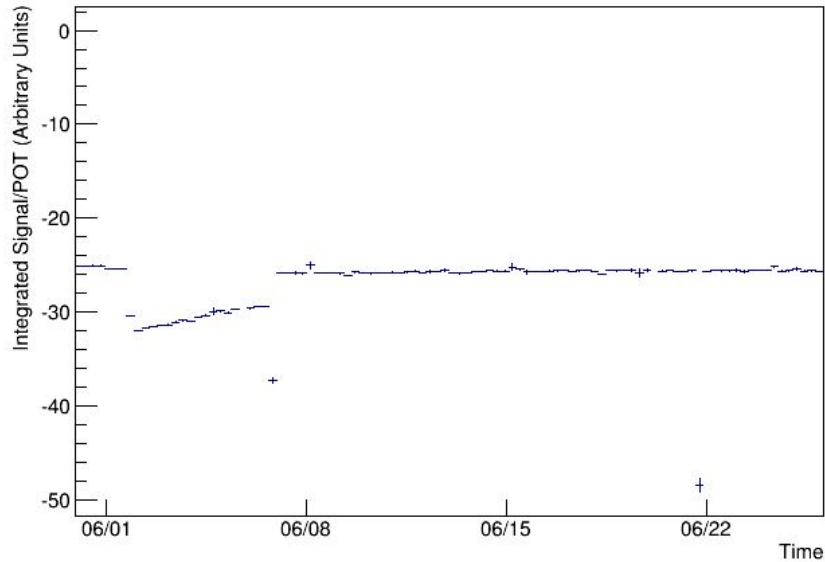
Gas Cherenkov Detector June 2016

- Stability of signal normalized to protons on target
- Pressure scan on June 7 and June 22 at seven different pressures: 8, 16, 32, 60, 100, 150, and 200 psi.

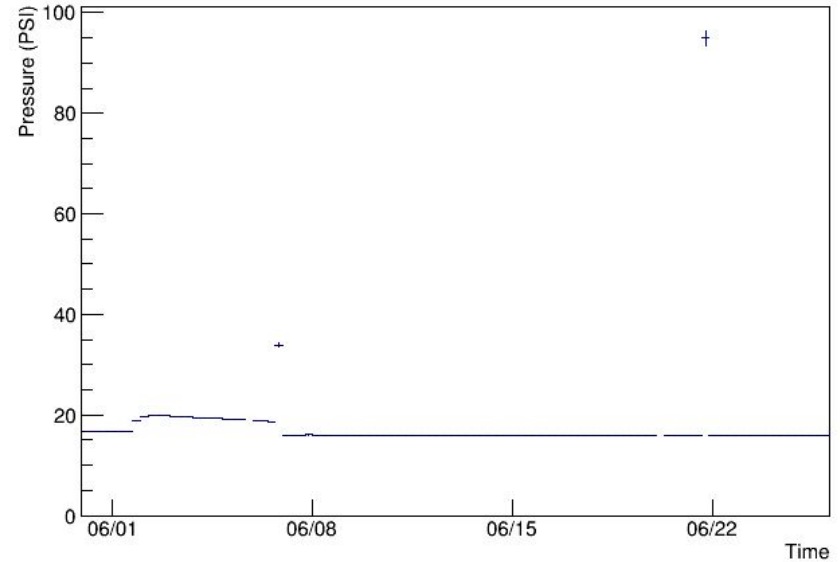
Stability

- Signal is stable overall. The dip can be explained by the change in pressure.

Integrated Signal per POT vs Time June 2016



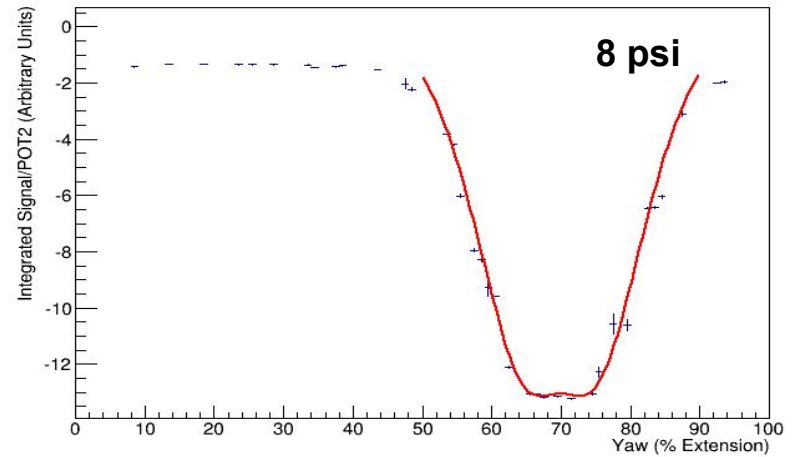
Pressure vs Time June 2016



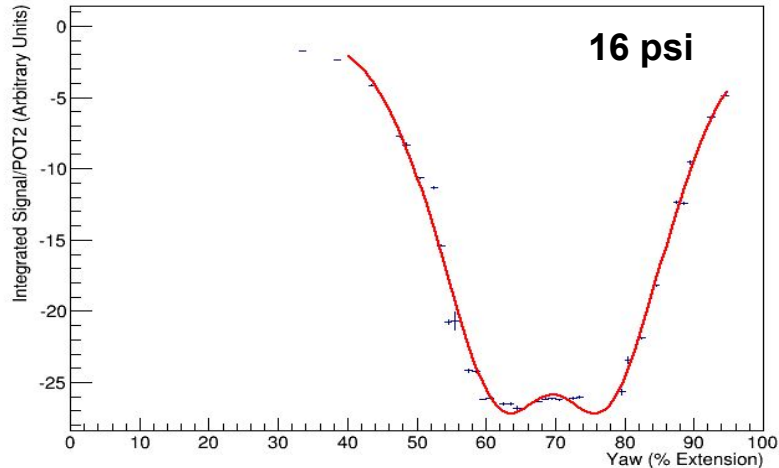
- Integrated Signal/POT vs Yaw (%extension)
- “W” shape more pronounced at higher pressures
- Difficult to fit data at higher pressures with five parameter function:

$$P_1 * e^{-\frac{(x-P_2)^2}{2*P_3}} + P_4 * e^{-\frac{(x-P_2)^2}{2*P_5}}$$

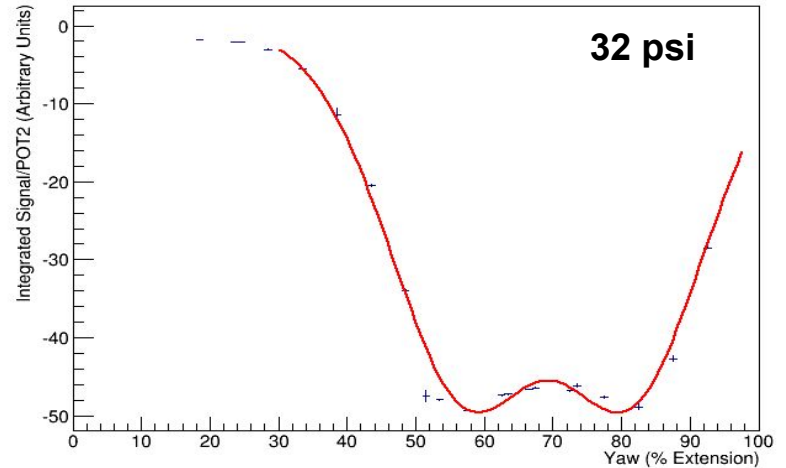
Integrated Signal per POT2 vs Yaw at 8 psi June 7



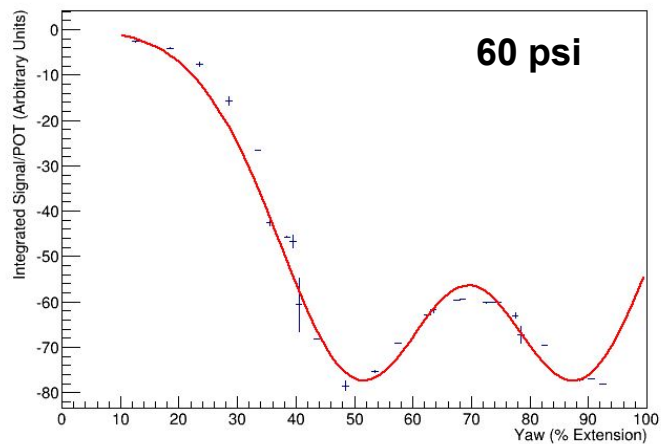
Integrated Signal per POT2 vs Yaw at 16 psi June 7



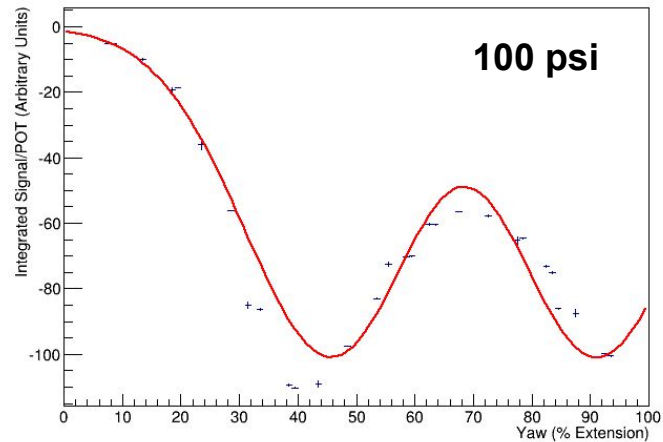
Integrated Signal per POT2 vs Yaw at 32 psi June 7



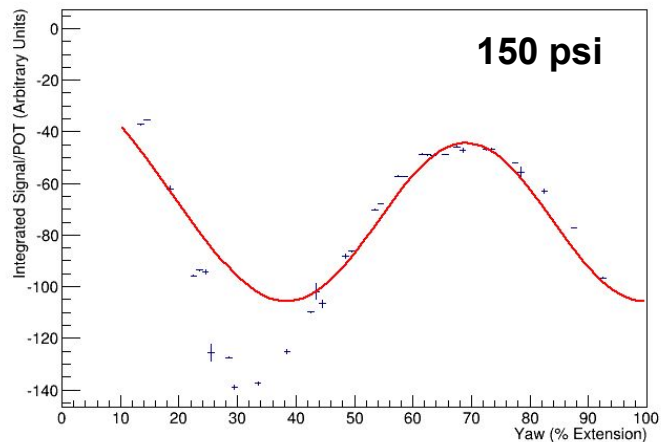
Integrated Signal per POT vs Yaw at 60 psi June 7



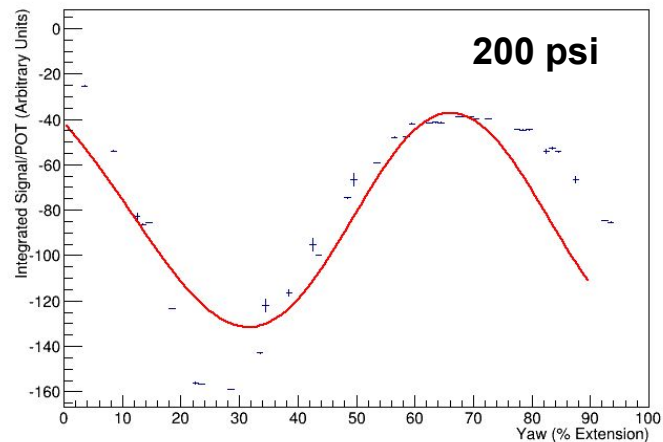
Integrated Signal per POT vs Yaw at 100 psi June 7



Integrated Signal per POT vs Yaw at 150 psi June 22



Integrated Signal per POT vs Yaw at 200 psi June 22

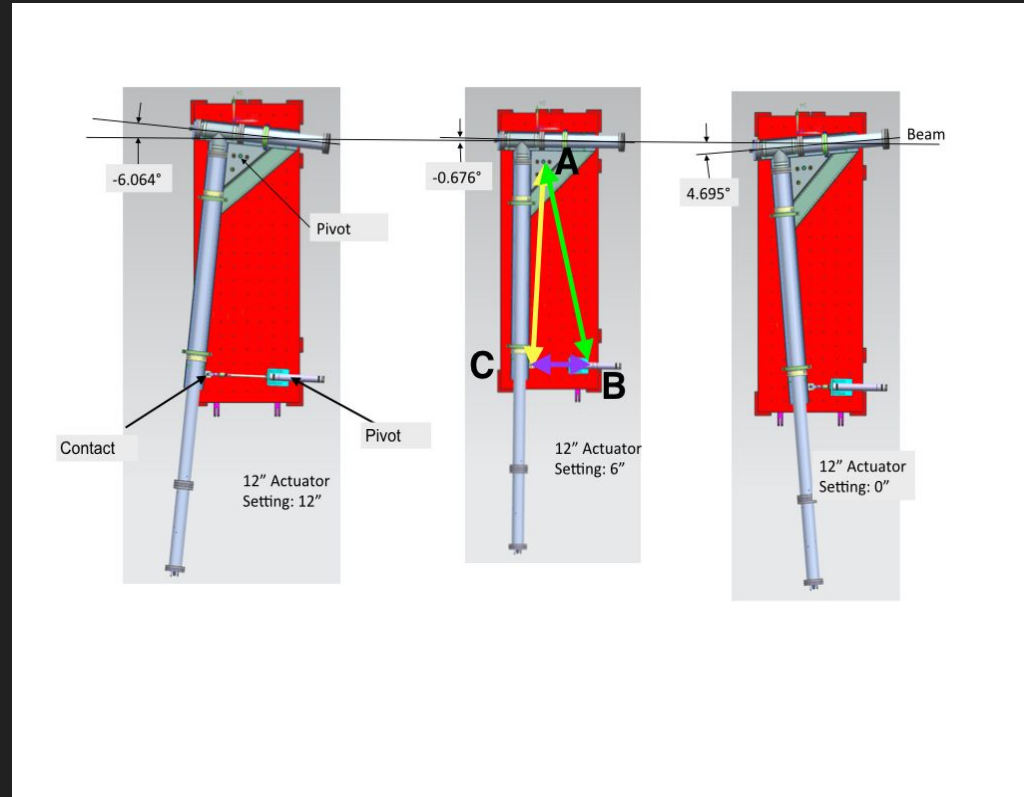


Yaw Angle Conversions

- We can convert the percent extension of the yaw actuator into an angle using the equation:

$$\theta(x) = \cos^{-1} \left(\frac{\overline{AB}^2 + \overline{AC}^2 - (12x + 7.24)^2}{2 * \overline{AB} * \overline{AC}} \right) - 13.870^\circ$$

where 0° corresponds to 69.56% extension, when the detector is aligned with the beam.
(Refer to DUNE-doc-1432-v1)



Future Plans

- We will run G4NuMI simulations to compare results with our data
- Pressure scan during anti-neutrino run as well as monitoring the signal