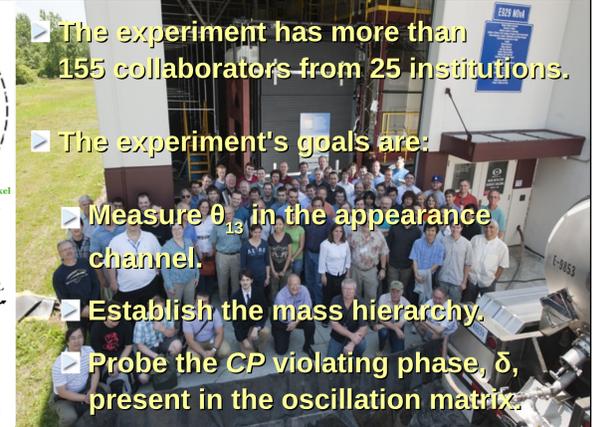
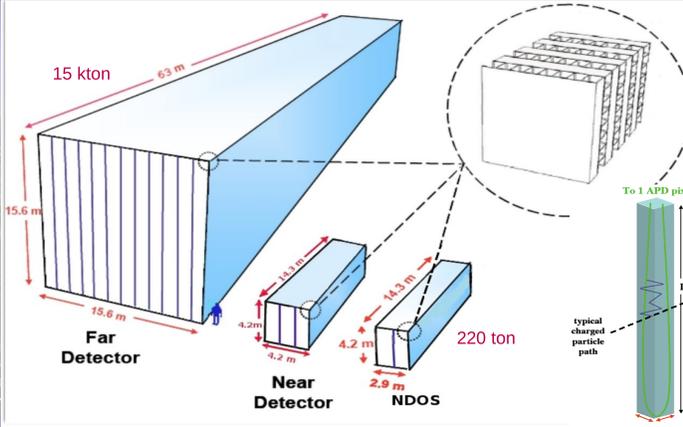
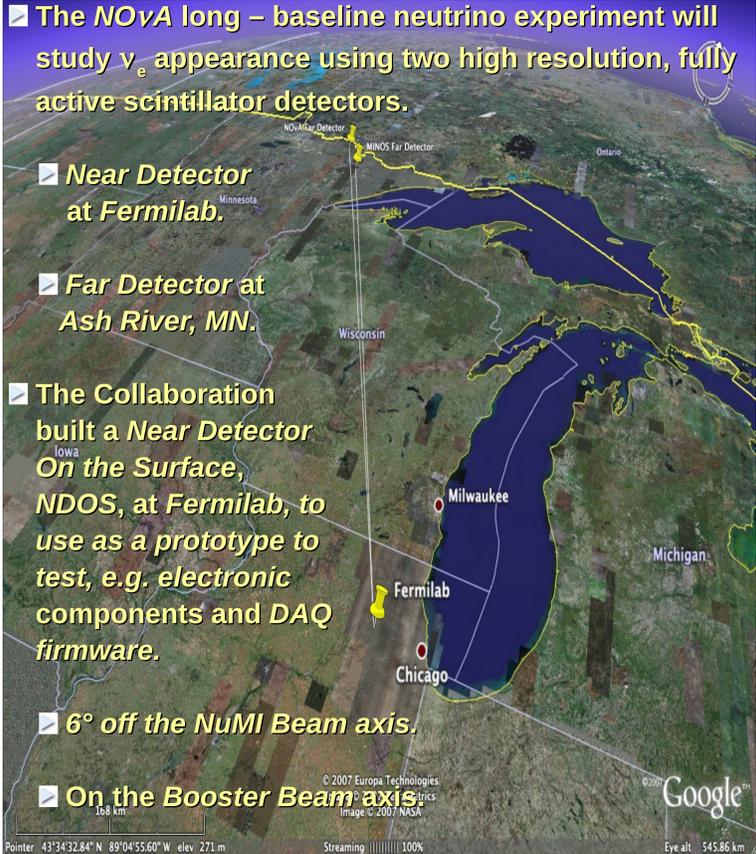




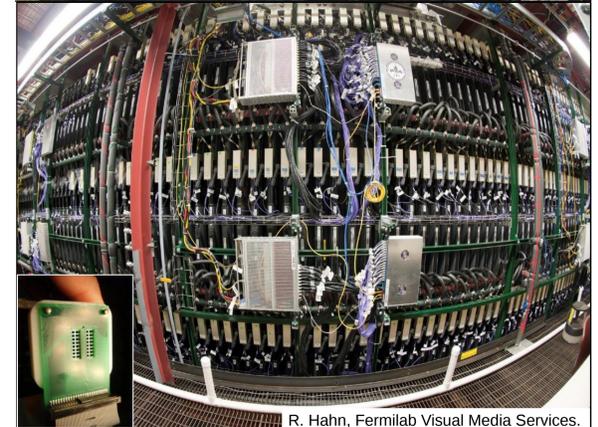
# CALIBRATION AND RECONSTRUCTION IN THE NOVA DETECTORS



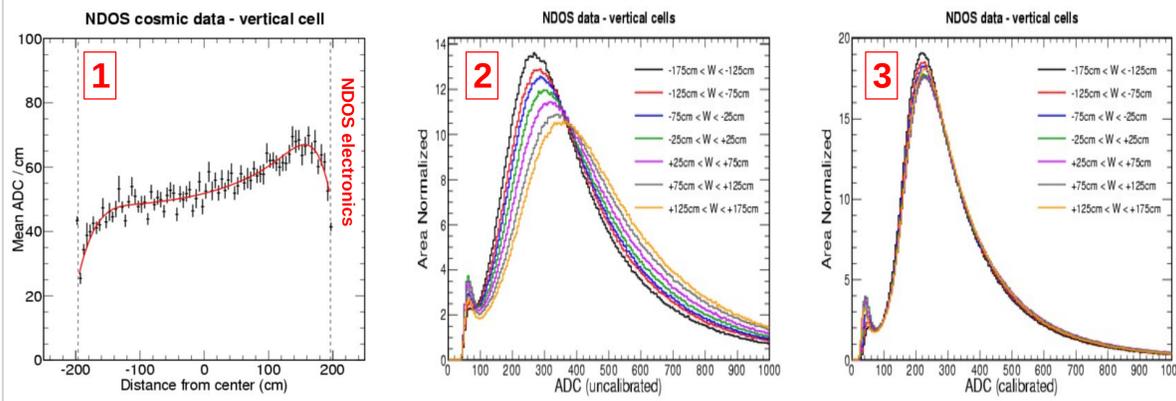
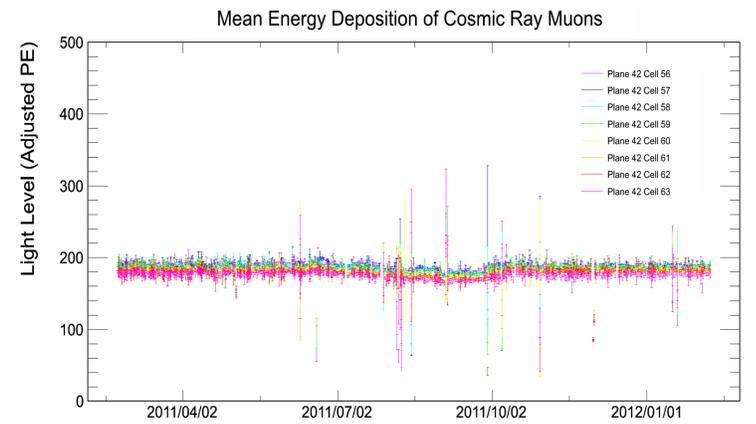
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On behalf of the NOVA Collaboration



- The detectors are made out of PVC Modules.
- They are filled with Liquid Scintillator.
- The Modules are layered planes of orthogonal views.
- The Planes are divided into Cells, and each Cell has a Wavelength Shifting Fiber to collect light.
- The light is detected by Avalanche Photo Diodes.

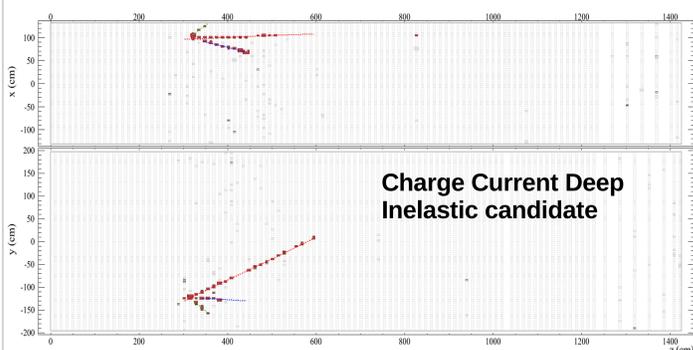
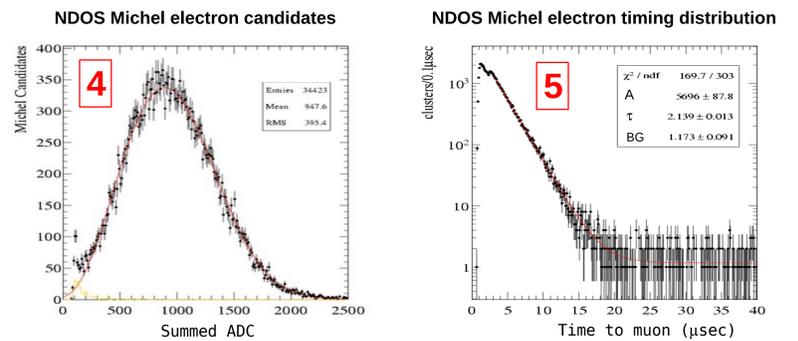


- The NDOS measures the Access Deficit Charge deposition per Cell, and from it the calibration process finds scaling factors to reconstruct the true energy deposited.
- The approximate number of PhotoElectrons, PE, in a Cell per event is a rescaling of the charge at the peak of the ADC distribution.
- To account for the differences in light yield due to the distance, W, of a hit in a Cell to its APD: the PE are scaled to PECorr such that  $PECorr_i = PECorr_j$ , means that the true energy depositions  $E_i$  and  $E_j$  are the same regardless of the  $W_i$  and  $W_j$ .



- Mean ADC / cm vs. distance, W. The fit is used to account for the variations in the light yield as a function of W.
- ADC distributions for various W slices before the attenuation corrections.
- ADC distributions for various W slices after the attenuation corrections.

- Stopping muons are a good sample to calibrate absolute energy since the energy deposited in the last portion of their path is known.
- The reconstructed track – length is used in the calibration process, along with the charge deposition, to calculate scale factors, using the Minimum Ionizing Particle and Bethe – Bloch concepts, which allow to get true energy.
- Michel electrons studies would provide a scale factor to convert PECorr to true energy since their energy distribution is well – known.



- The Michel electron candidates are required to be within 30 cm of the muon end point, and between 3 – 10 μsec of the muon.
- $A(t) = Ae^{-t/\tau} + BG$ . The timing distribution agrees with the expected value,  $\tau_c = 2.123 \mu\text{sec}$ , from cosmic  $\mu^-$  and  $\mu^+$ , and shows low background, BG.

