

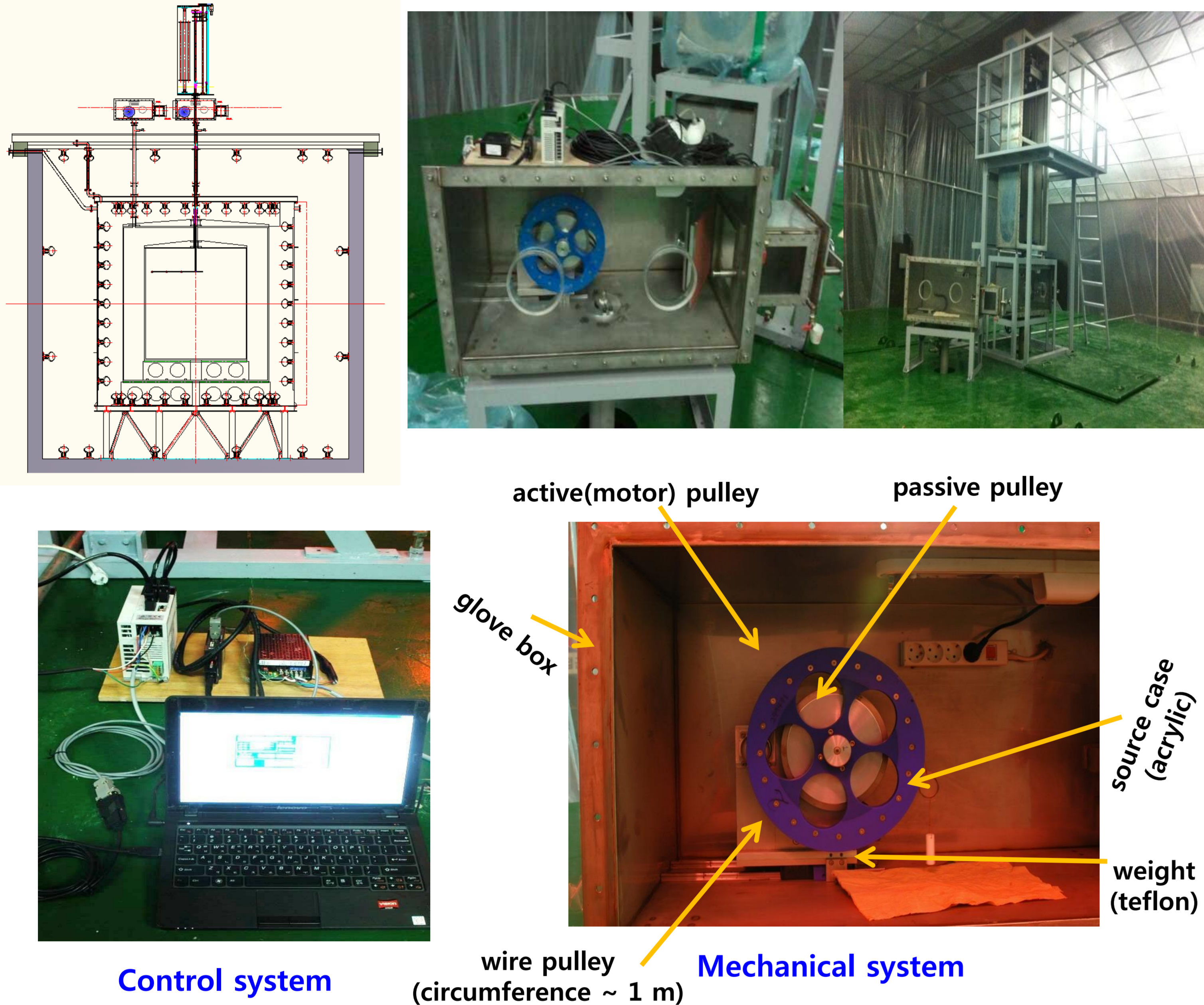
Energy calibration and slow control monitoring at RENO

June Ho Choi (Dongshin University)

For RENO collaboration

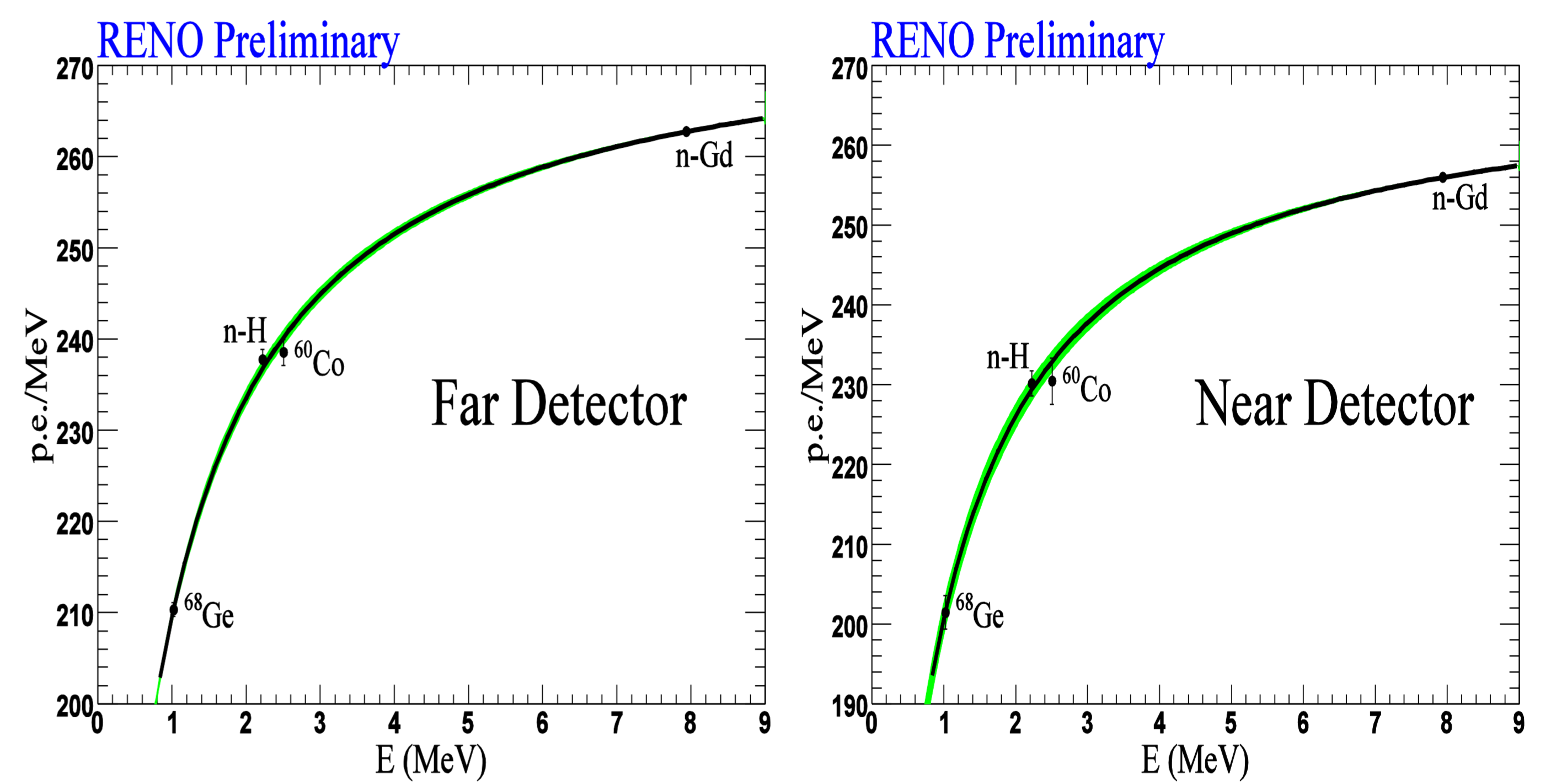


Calibration System



Energy scale Uncertainty

- Calculation Method
 - Calculate the mean and error of Neutron H capture & Co source data point
 - X axis(MeV) : Average of n-H capture & ^{60}Co data point
 - Y axis(n.p.e) : Error weighted Mean of n-H capture & ^{60}Co data point
 - Draw the error band by using 1σ error of Ge & n-Gd capture



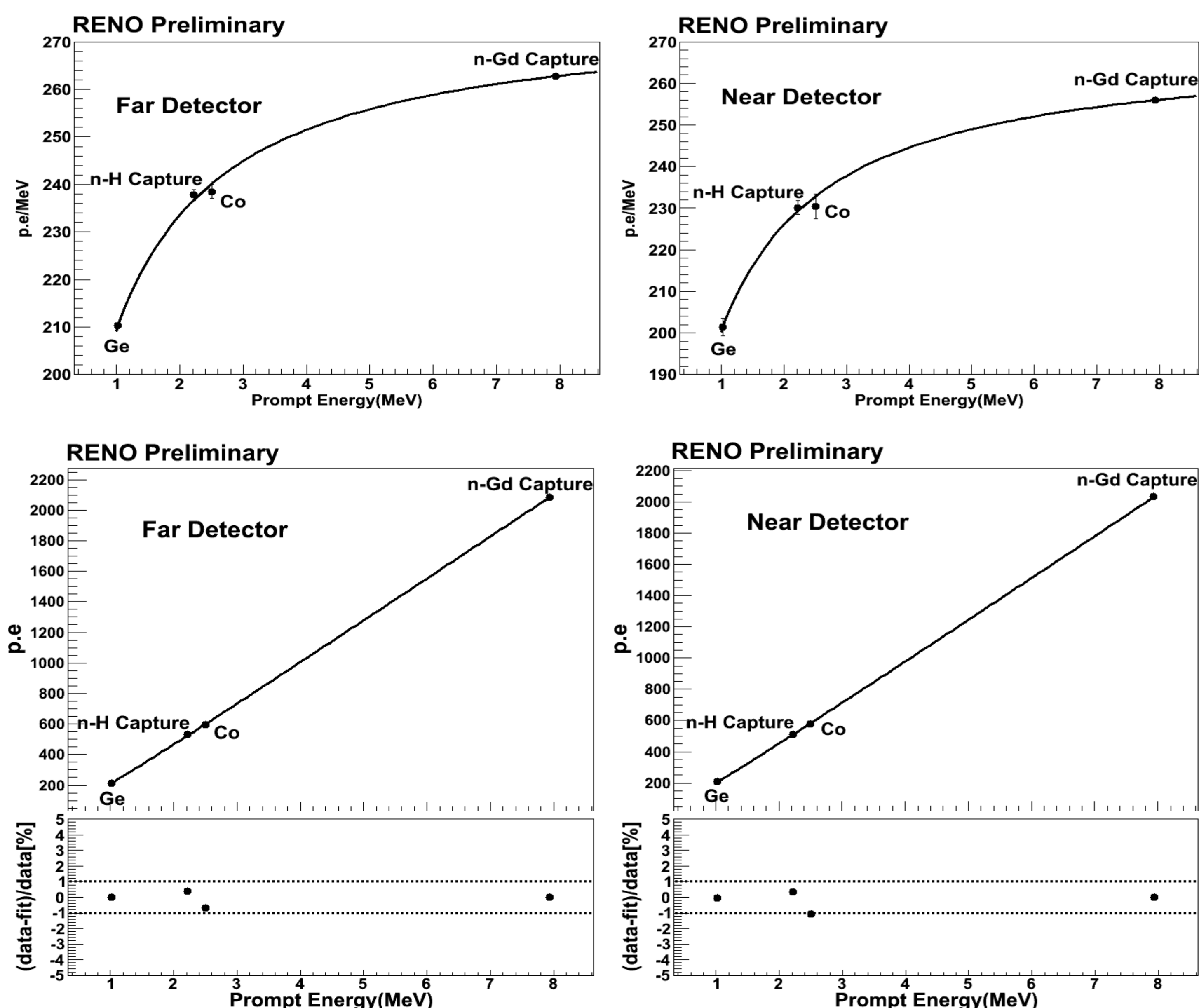
Energy calibration

Energy scale calibration

- Radioactive source
 - ^{68}Ge (2×0.511 MeV)
 - ^{60}Co (2.5057 MeV)
 - Neutron H & Gd capture (2.223 MeV & 7.937 MeV)
- Slight non-linearity observed
- NPE(x) to MeV : $f(x)$ in MeV

$$\Rightarrow 269.630 \cdot x - \frac{0.00160139 \cdot x}{1 - \exp(-1.35684 \times 10^{-4} \cdot x - 9.65110 \times 10^{-5})} \text{ @ Near Detector}$$

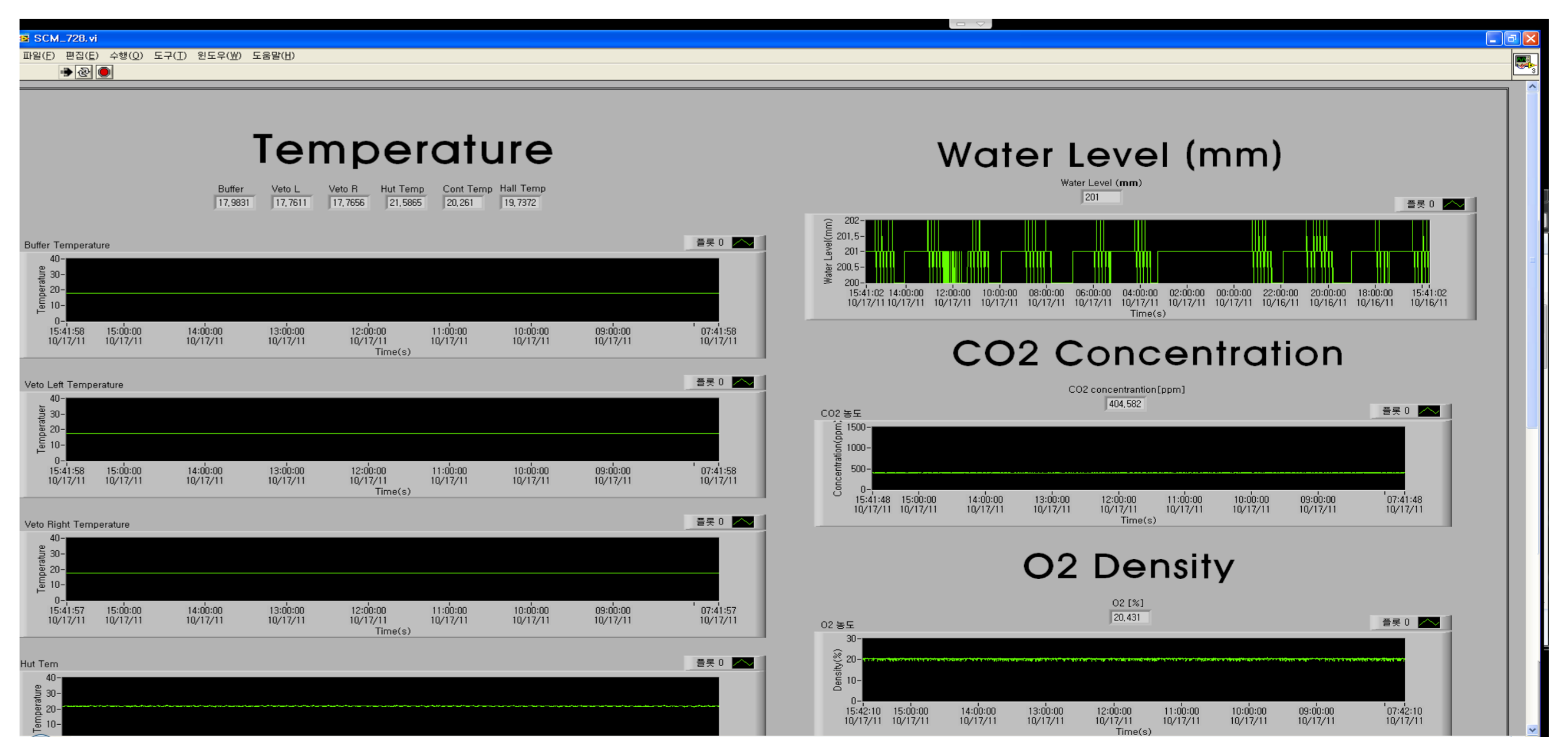
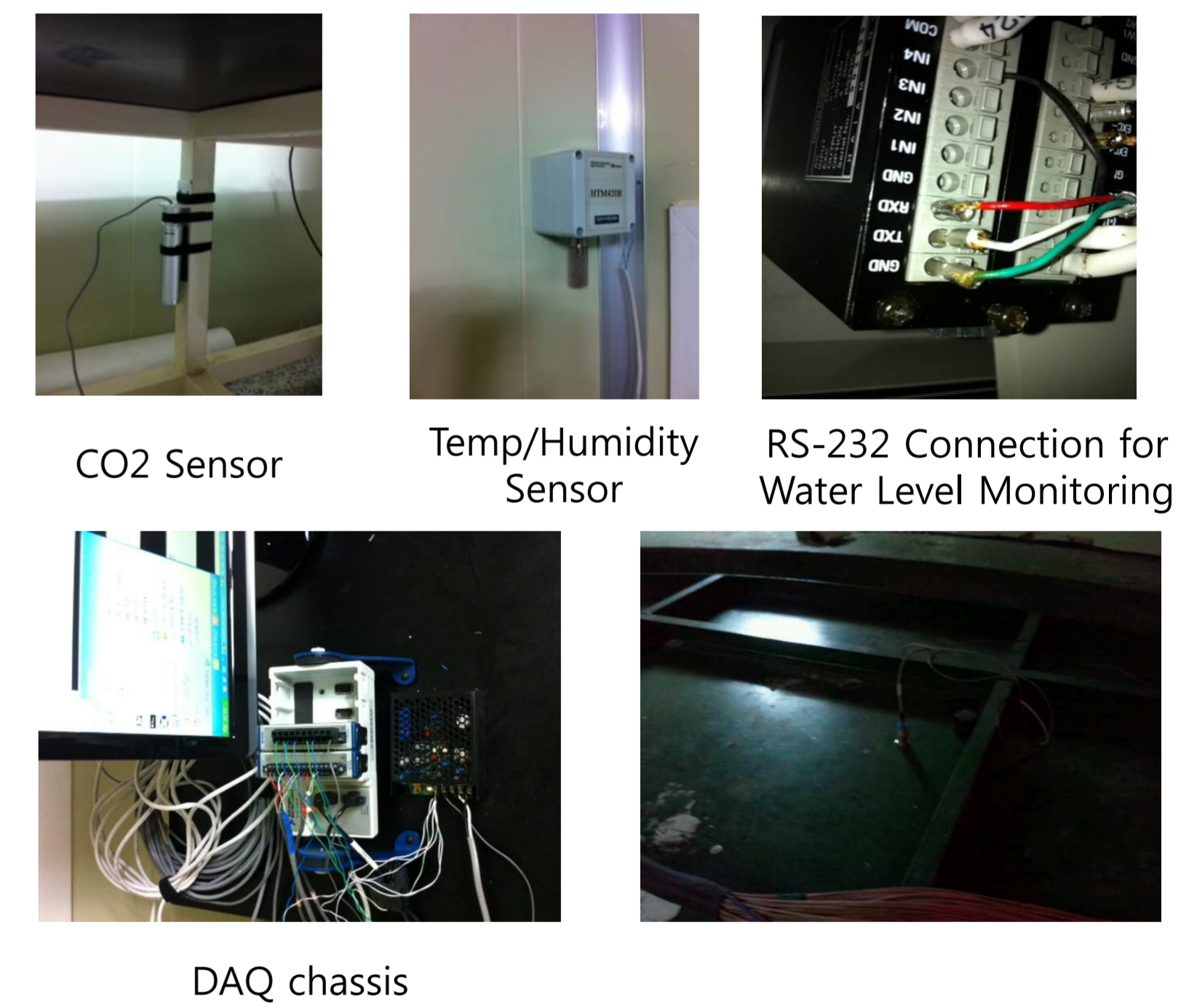
$$\Rightarrow 276.402 \cdot x - \frac{0.00256186 \cdot x}{1 - \exp(-2.15627 \times 10^{-4} \cdot x - 1.67555 \times 10^{-4})} \text{ @ Far Detector}$$



Slow Control Monitoring System

Component of SCM System

- Gas Concentration – CO₂ & O₂
 - KCD-HP500 : CO₂ concentration measurement using IR absorption
 - Honeywell XCD : O₂ concentration
- Water Level
 - Using ultrasonic sensor with RS232 interface
- Detector Temperature
 - PT-100 thermocouple.
- Humidity & Temperature
 - HTM420R
- PMT HV Adjustment & Monitor



PMT HV control system PMT HV monitoring system

