

Thank you for useful comments. Please find my responses below.

- 1) Figure 3 is now clearly divided into left and right columns and identified as a) and b). The horizontal axis units are also indicated. I make it clear that the vertical scale is ADC counts in the caption.
- 2) The objective of the Figure 4.d is to show that if only the Cherenkov signal is collected in short time (<10 ns), the energy resolution is improved using GNN. The reason is that the shower “image” is crispy formed in this case (as opposed to “blurry” images formed using ionization signal in long times) and the image correlates with the invisible energy as displayed in panels a) and b). The difference between the dashed green line and the blue dots comes from the shower containment where the green line indicates the energy resolution for full containment and the blue dots indicate when the signals from the smaller instrumented region (54 by 54 copper rods) are utilized. As noted above, the improvement displayed by the orange markers stems from the short signal collection time that is precisely timed. The simulation is based on 2D or 1x1 cm<sup>2</sup> transverse granularity. This is not to be confused with the 3D longitudinal segmentation with timing discussed earlier in Figure 3.
- 3) Figure 5 focuses on the role of the fiber refractive indices and how it impacts the calorimeter response in a high granularity 3D case. As shown in Figure 5.a, increasing refractive index leads to the sampling of increased number of shower particles, especially the protons, essentially alleviating the need for slow neutrons or long integration times for “compensation” in the conventional sense. The purple vs light green markers highlight better performance with higher refractive index. Although the simulation is performed with a fixed cell size (3x3x3 cm<sup>3</sup>), and now also added to the text, we aim to achieve comparable longitudinal segmentation by precision timing as touched upon in Figure 3.
- 4) The time difference between the signal arrival times of the straight (TA) and helical (TB) fibers provide the position, Z, of the energy deposition inside a calorimeter that is L deep. The equations for TA and TB are shown below, and we can easily solve for Z where the h is the helix factor that is uniquely determined by the pitch, lambda, and the radius of the helix, R. In other words, the difference  $TA-TB=(1-h)(L-Z)/v$  and Z is solved for. This is also included in the text now.  
As can be easily observed, the same concept would apply to two straight fibers with sufficiently different refractive indices as well.

