Status Report

Shota Izumiyama
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HK mPMT simulation: impacts of TTS

- ## MC: HK mPMT hybrid (B&L 20k, mPMT 10k)
  - 3-inch PMT: dark rate = 100 Hz, TTS (1σ) = {0.3, 0.6, 1.2, 1.8} ns
  - 20-inch B&L PMT: dark rate = 4.2 kHz, TTS (1σ) = 0.95 ns at 1p.e.
  - 10 MeV, 10,000 electrons, uniform in tank, isotropy
- ## Tuned the LEAF with new timing PDFs based on various TTS value (magenta)

Even if mPMT has smaller photo-coverage, it has better performance. Comparing same TTS, mPMT is better. But it might be other reasons.
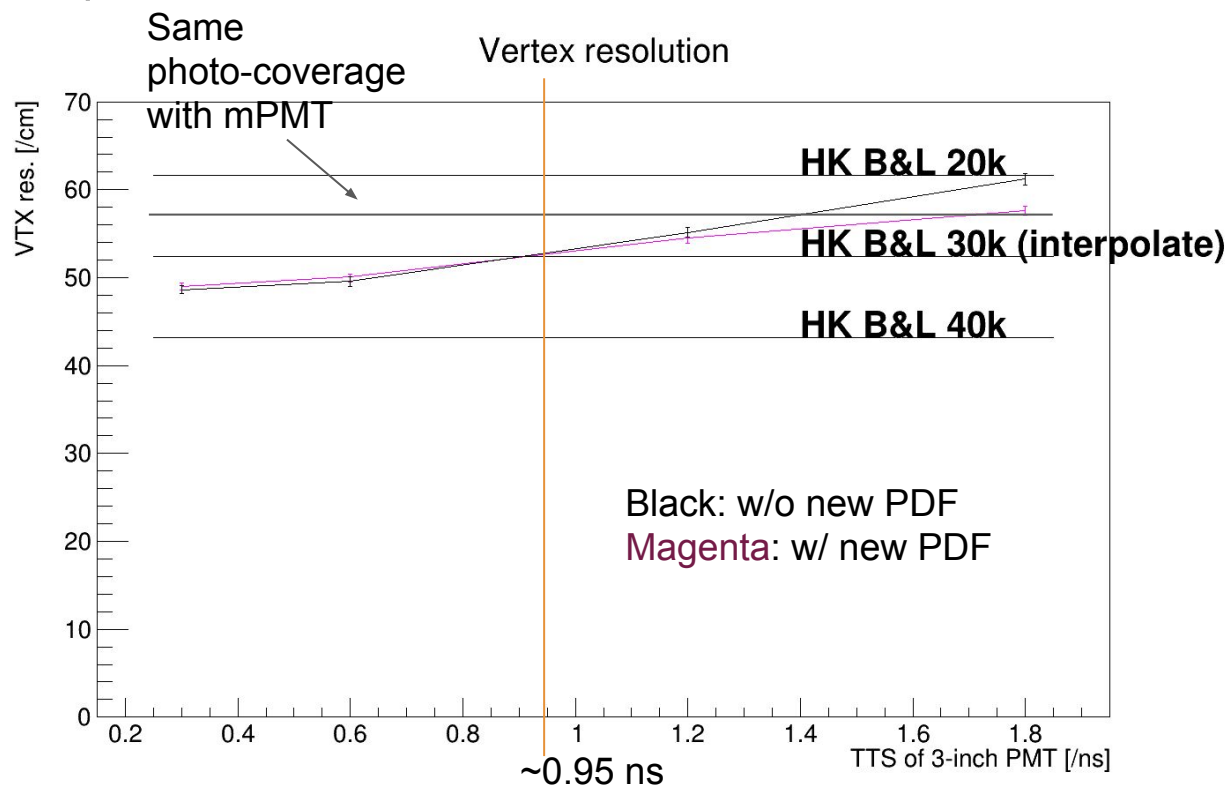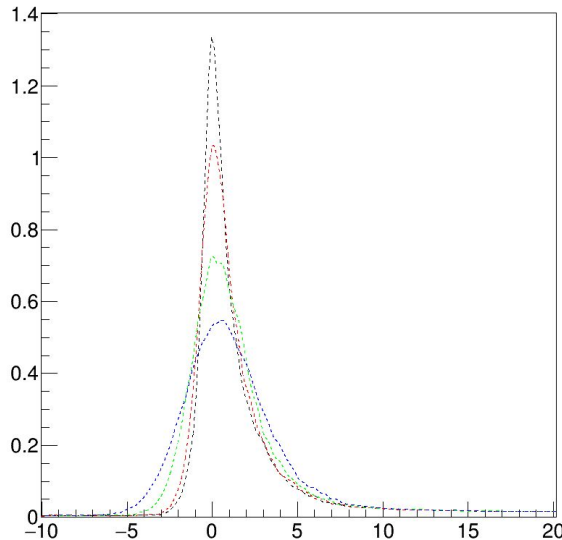
Backup

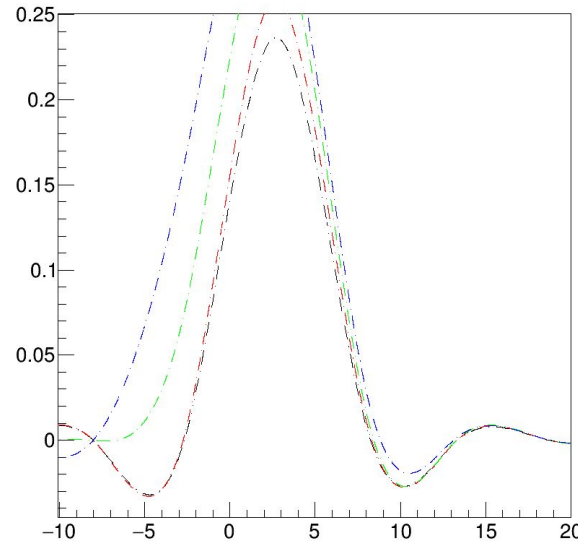I checked the timing PDF for LEAF

Re-drawn timing PDF

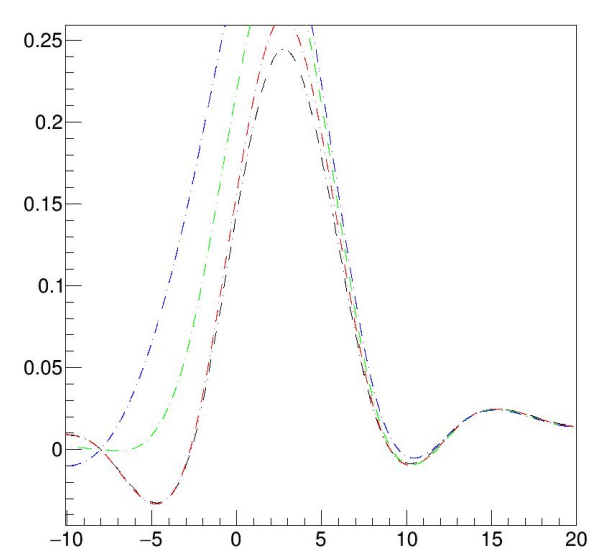- Drew the generated PDF aganin with only increased resolution → They became smooth-shape

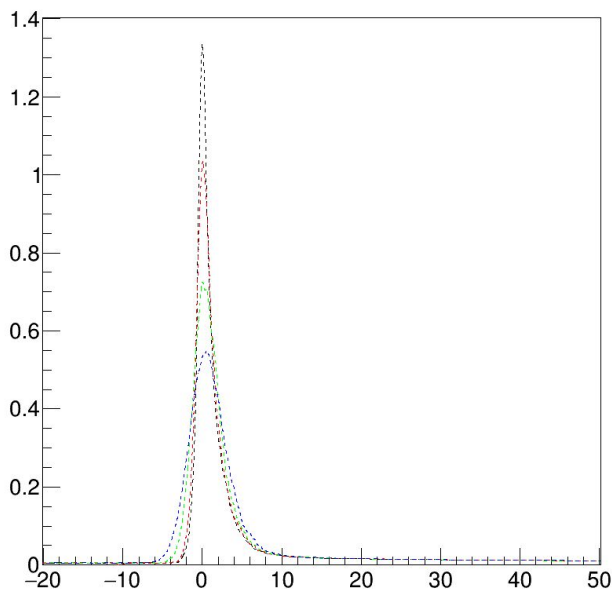splineExpoQueue0_1_0   splineExpoConv0_1_0   splineExpoConvIzu0_1_0

- splineExpoConv… have high fluctuation and bad (I think). But because LEAF uses splineExpoQueue which look good, the magenta of p.2 is the limit of today's LEAF, in my opinion.
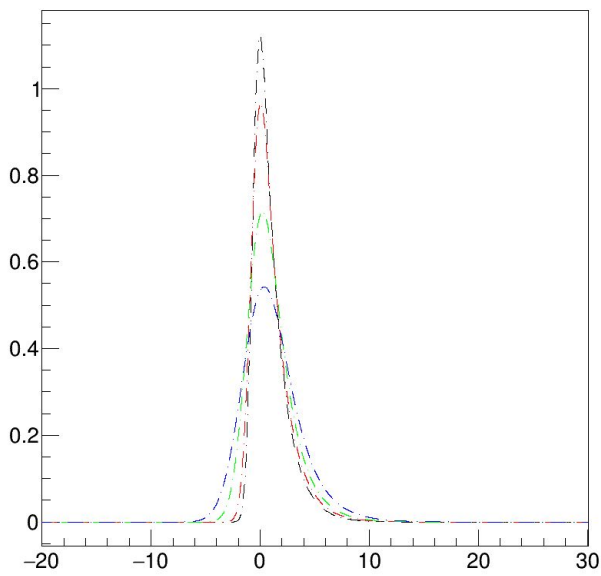
Towards improvement

- splineExpoConv_ had high fluctuation → I increased the number of points of making splines from 300 to 3000
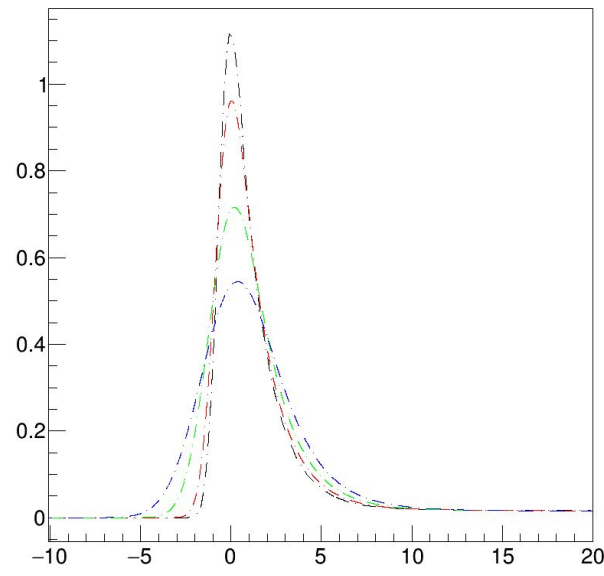

splineExpoQueue0_1_0

splineExpoConv0_1_0

splineExpoConvIzu0_1_0

- Succeeded the suppression of the fluctuation → I think we are ready to replace splineExpoQueue with splineExpoConv_ but I did not validate in the LEAF