

Moriah Tobin

Advisor: Mike Albrow

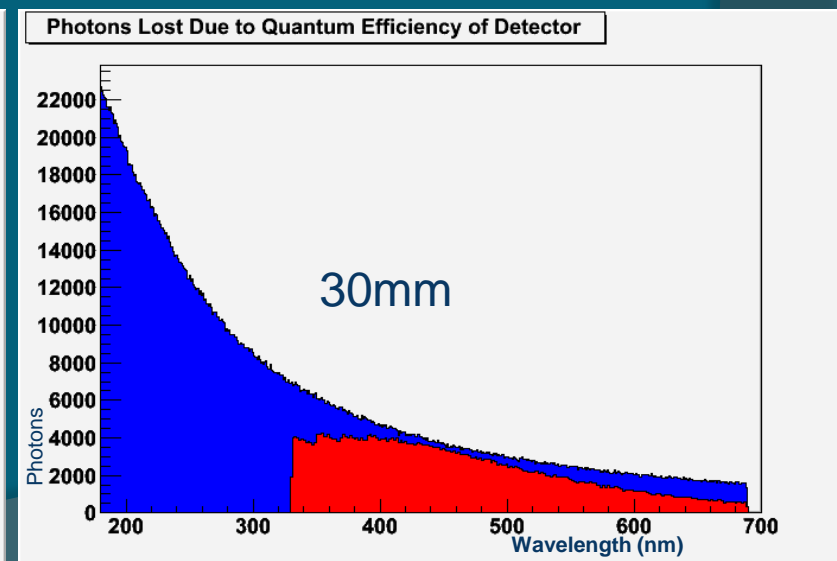
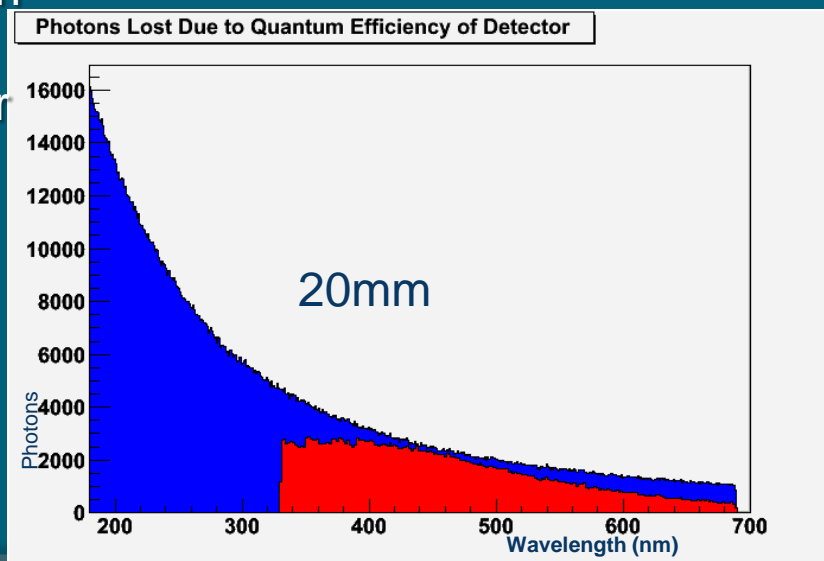
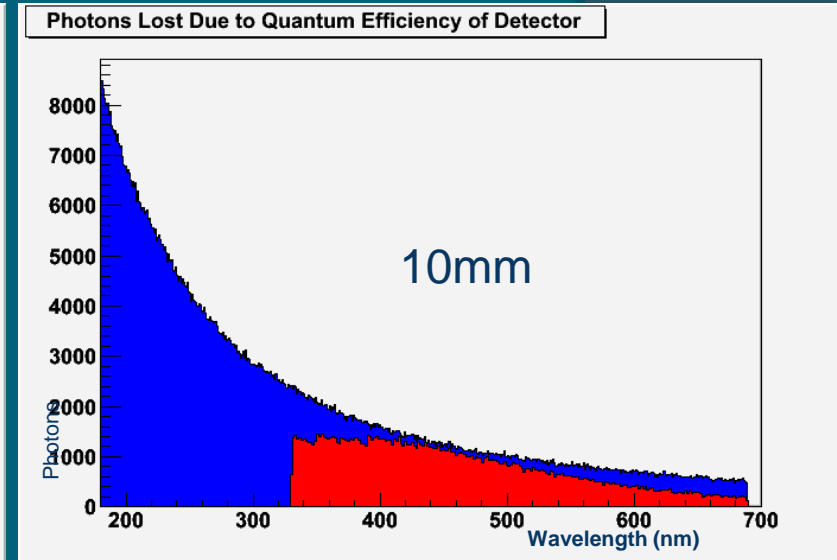
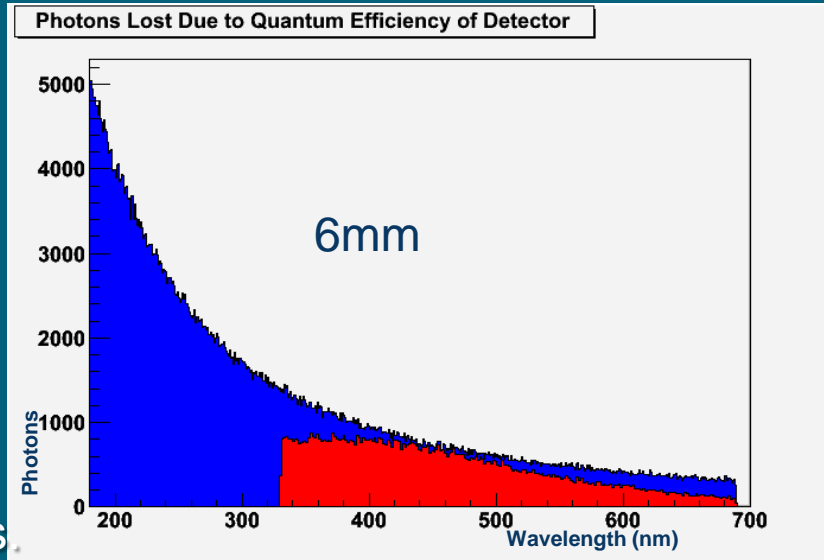
July 20, 2010

Modeling Quartz Cherenkov Detector

Outline

- Length Effects
- Next Step

Photons At Detector & Detected



No.
Photons vs.
Wavelength

At Detector
(Blue)

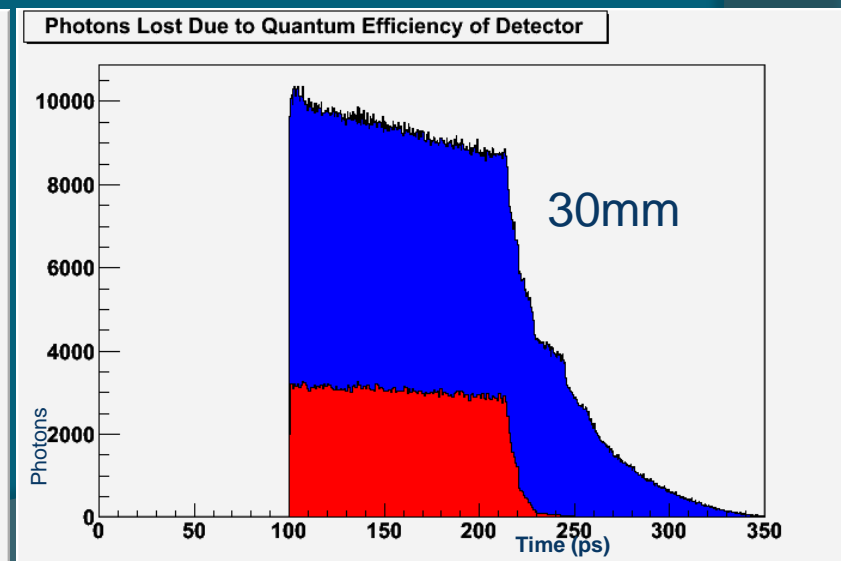
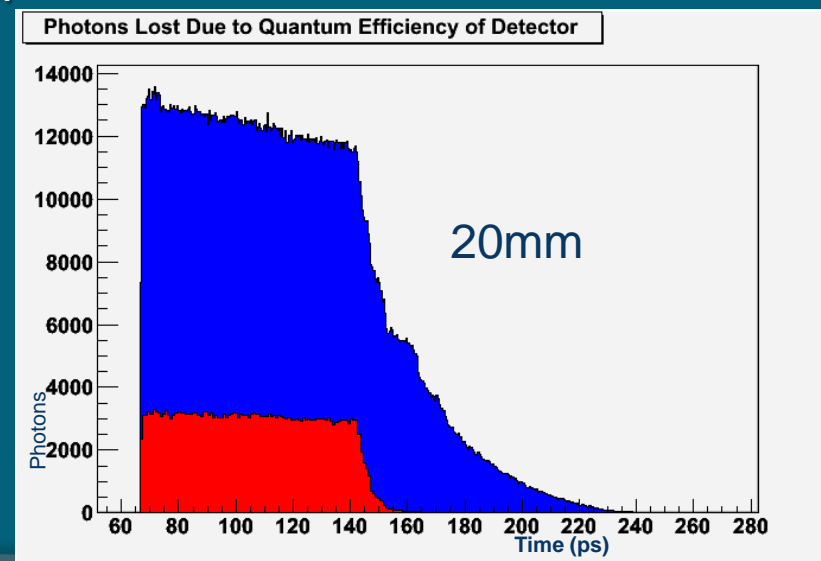
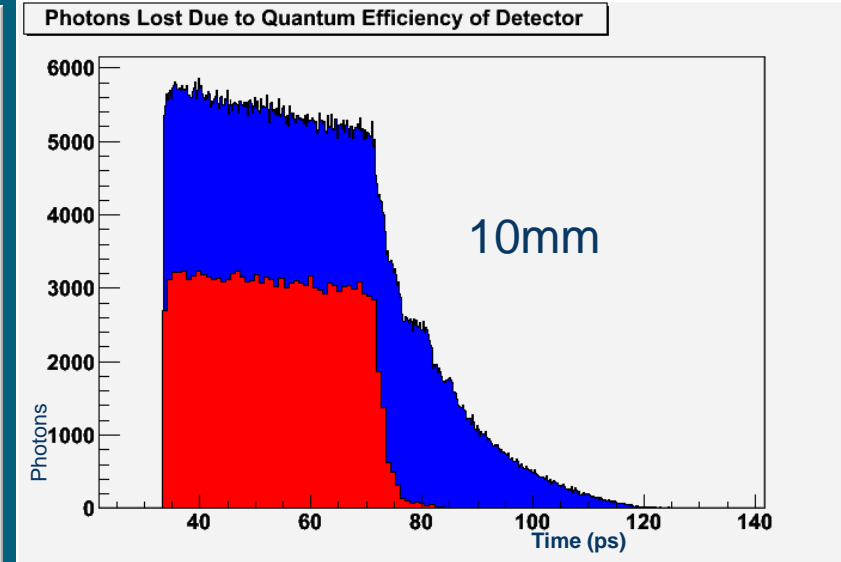
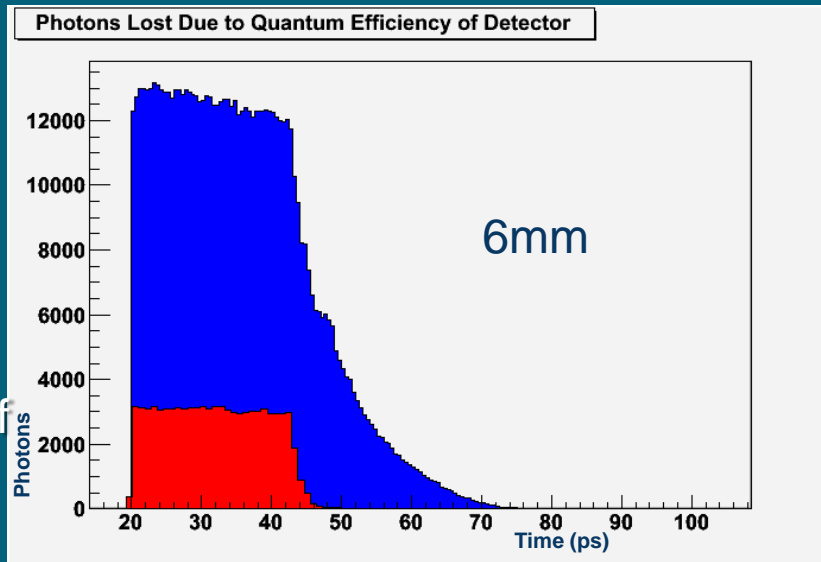
Detected
(Red)

Photons At Detector & Detected

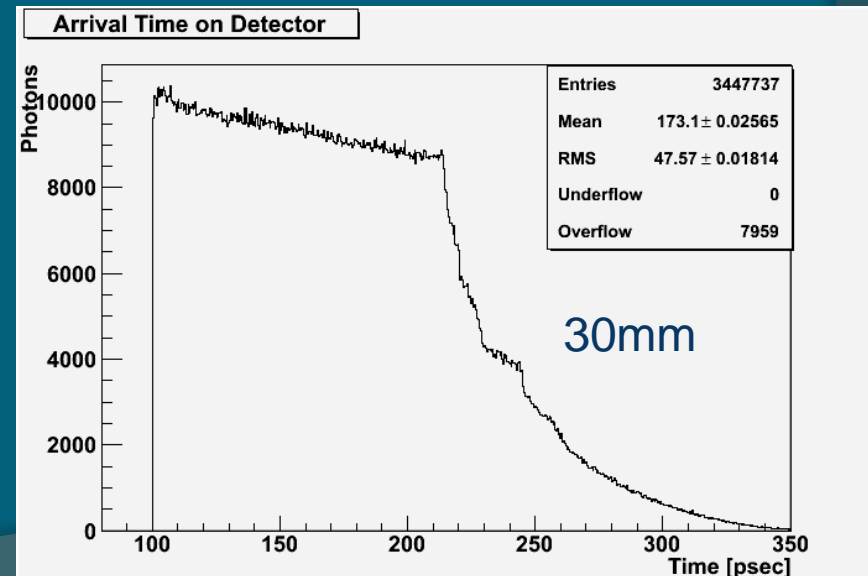
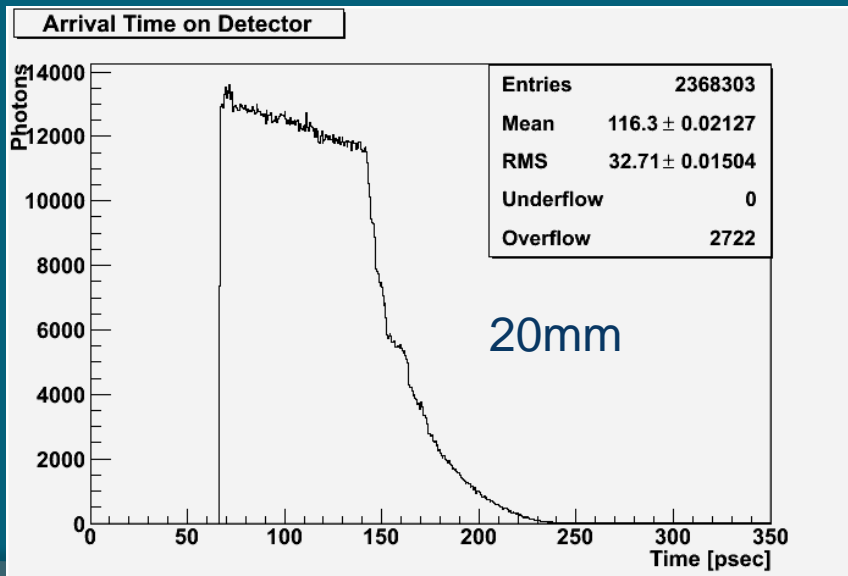
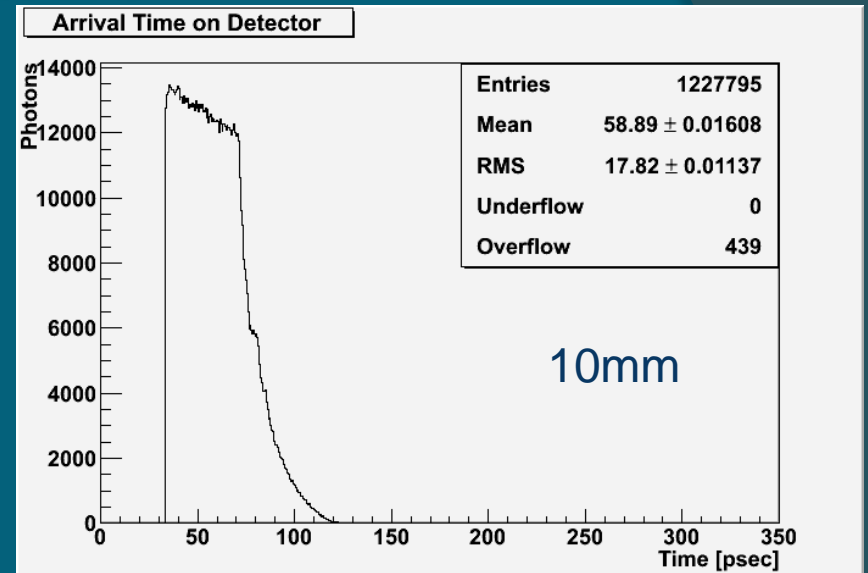
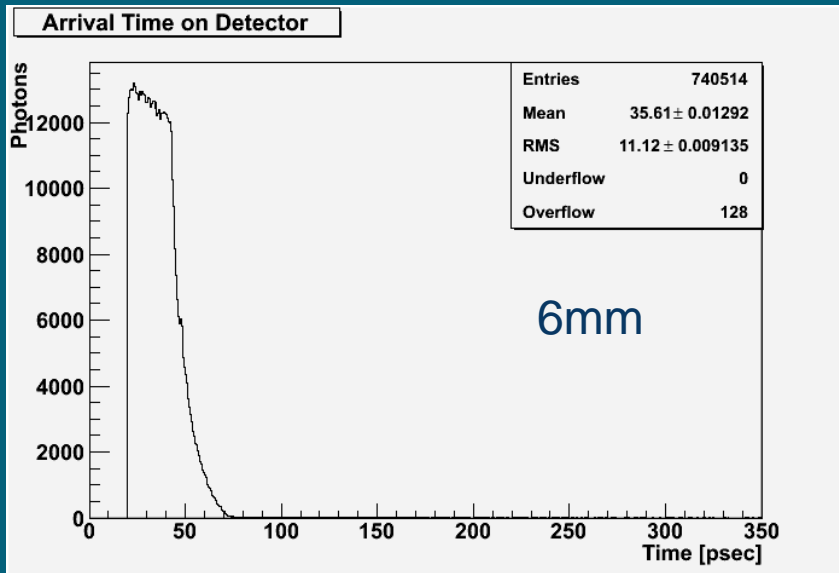
No.
Photons
vs. Time of
Arrival

At Detector
(Blue)

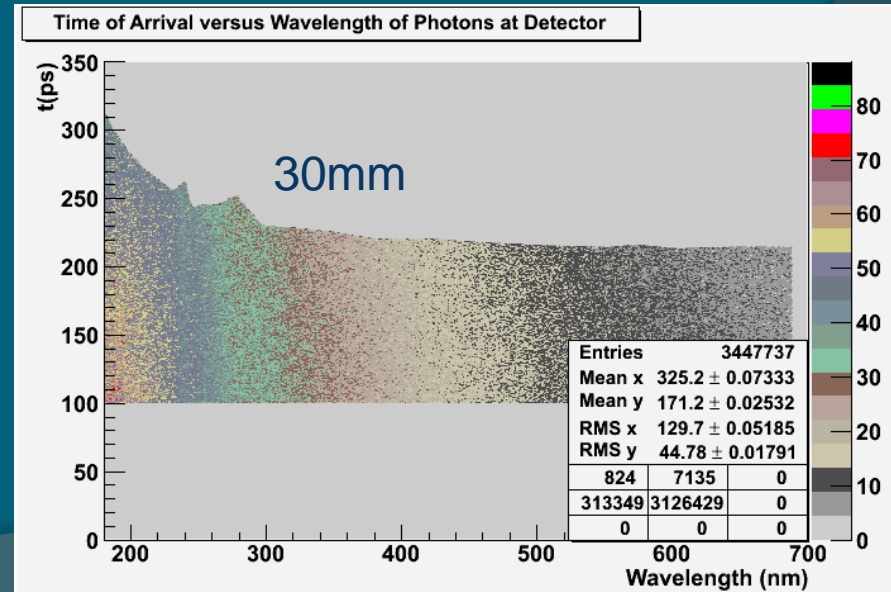
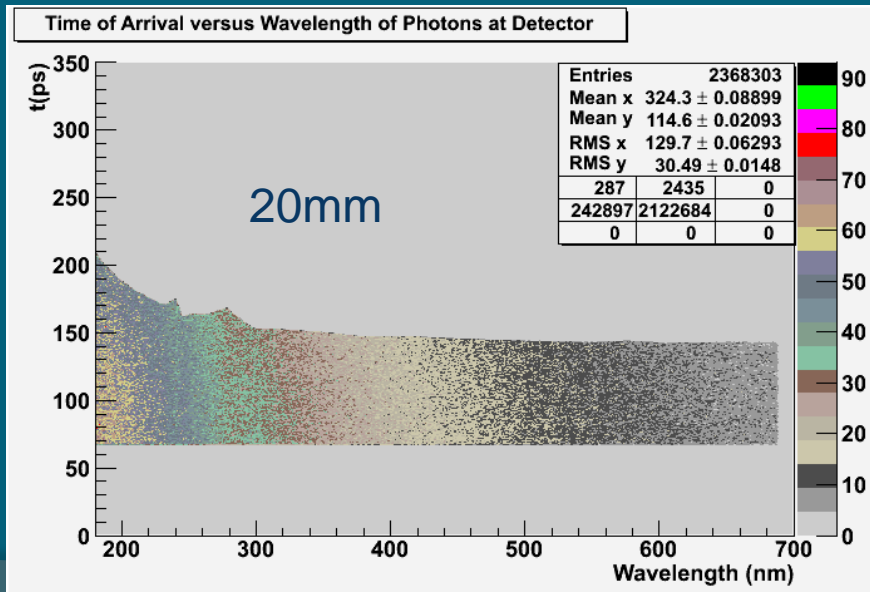
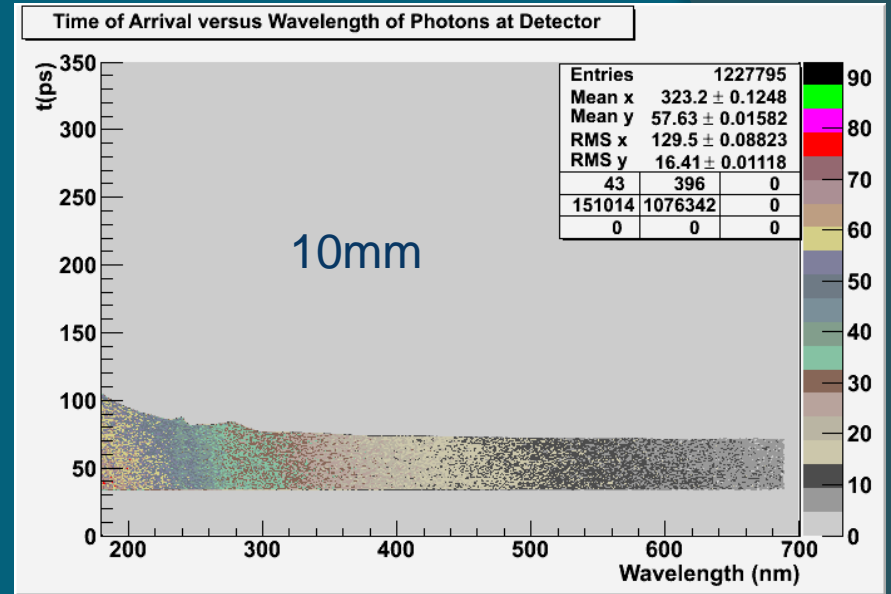
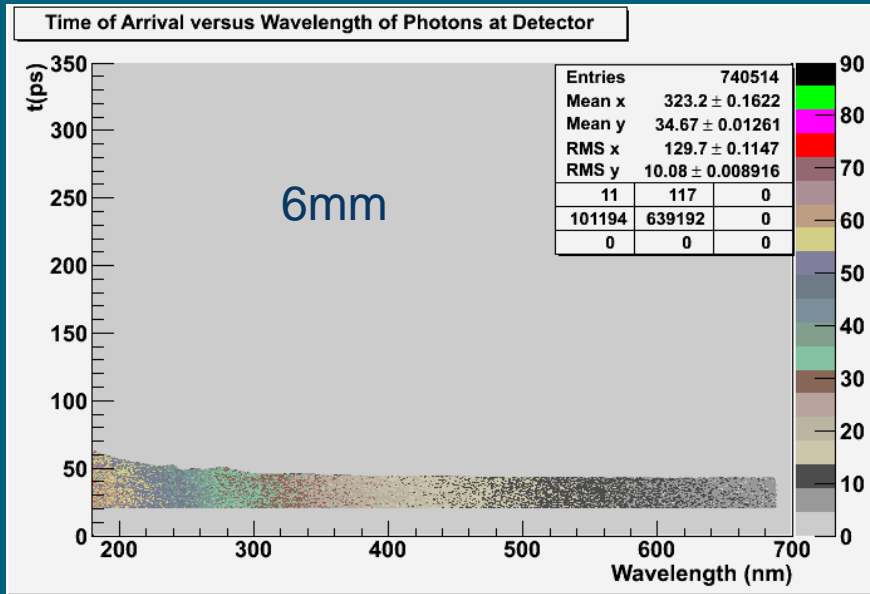
Detected
(Red)



Photons At Detector

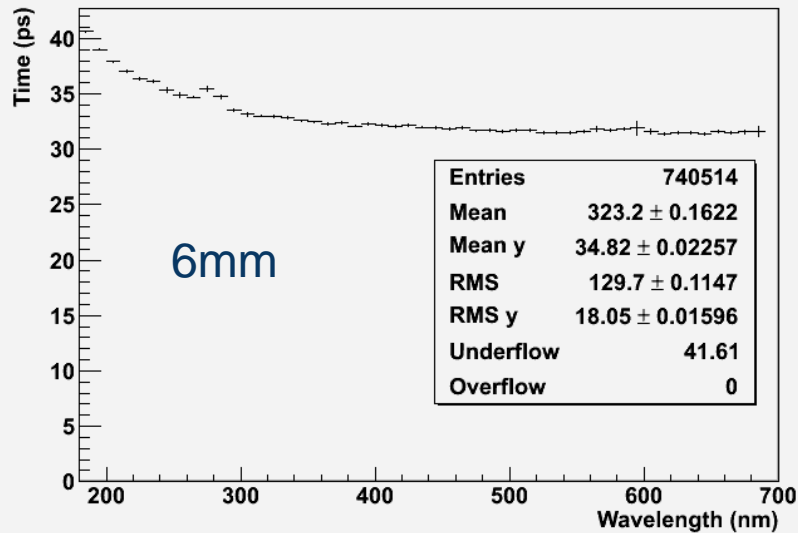


Time of Arrival vs. λ at Det.

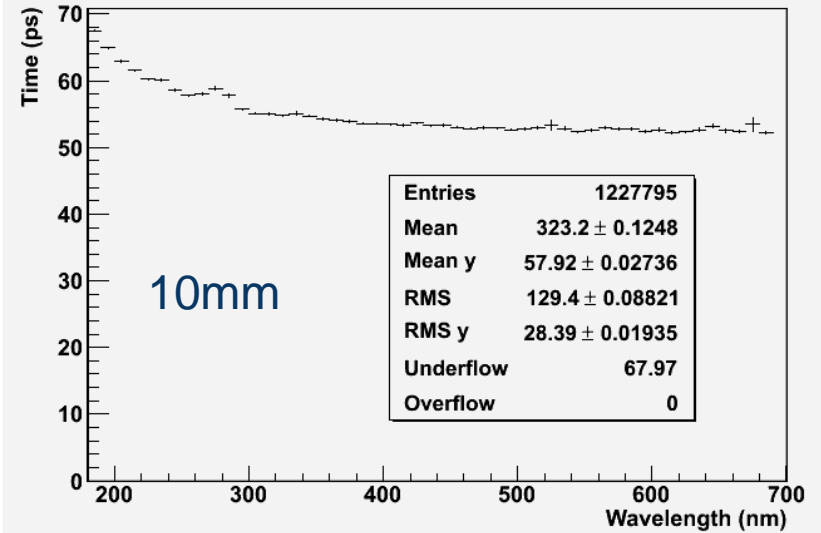


Avg. Arrival Time vs. λ at Det.

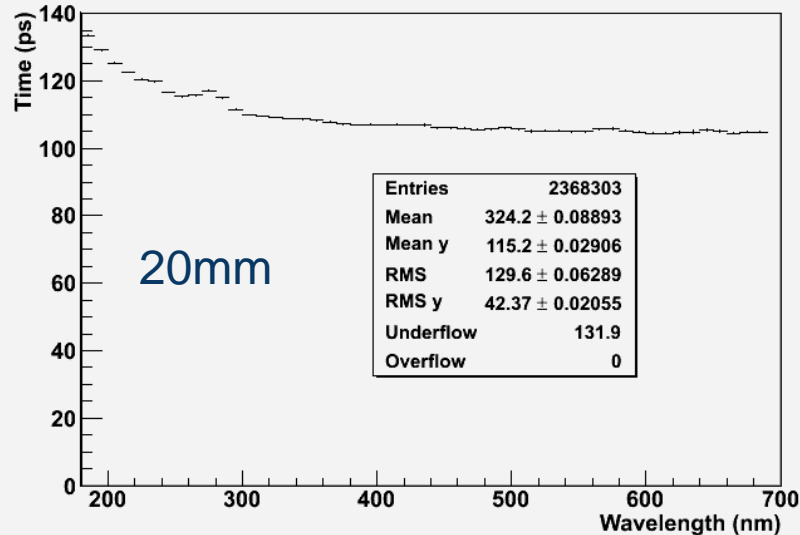
Average Time of Arrival vs. Wavelength of Photons at Detector



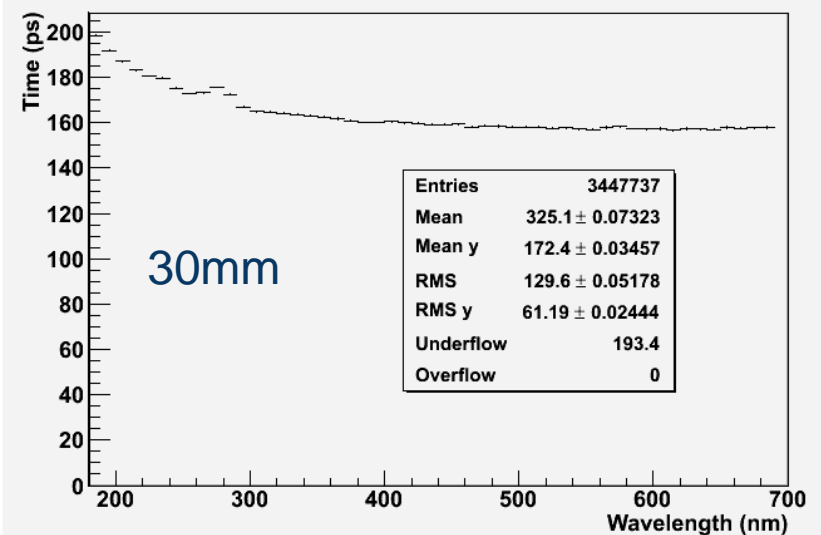
Average Time of Arrival vs. Wavelength of Photons at Detector



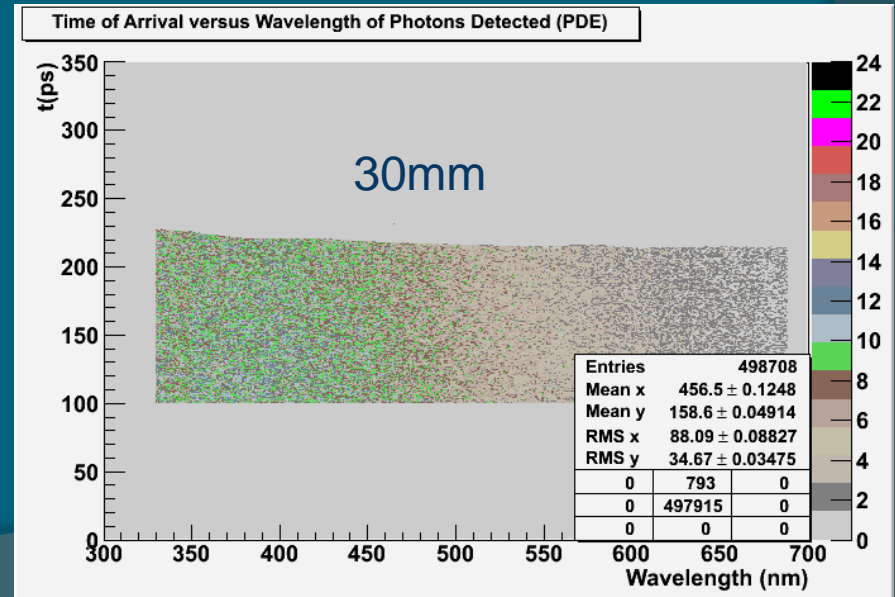
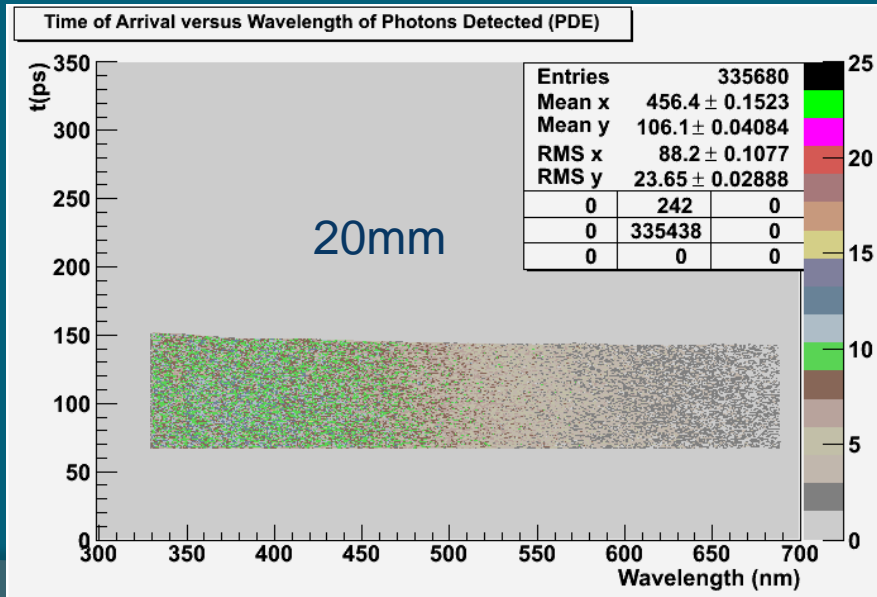
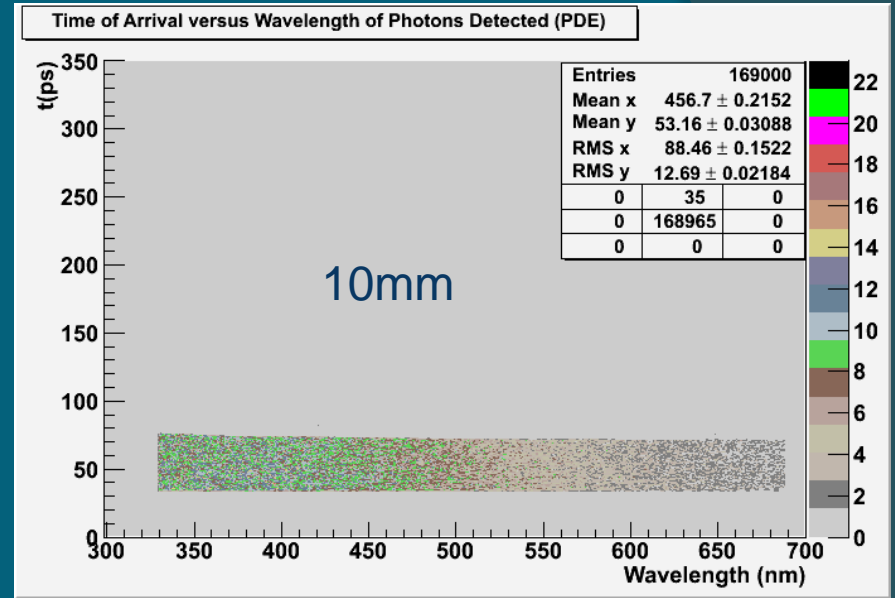
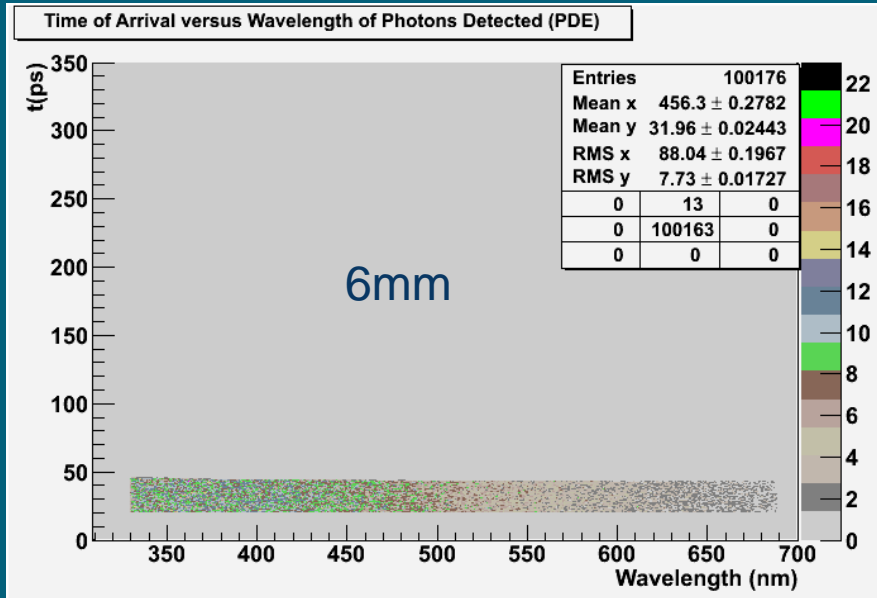
Average Time of Arrival vs. Wavelength of Photons at Detector



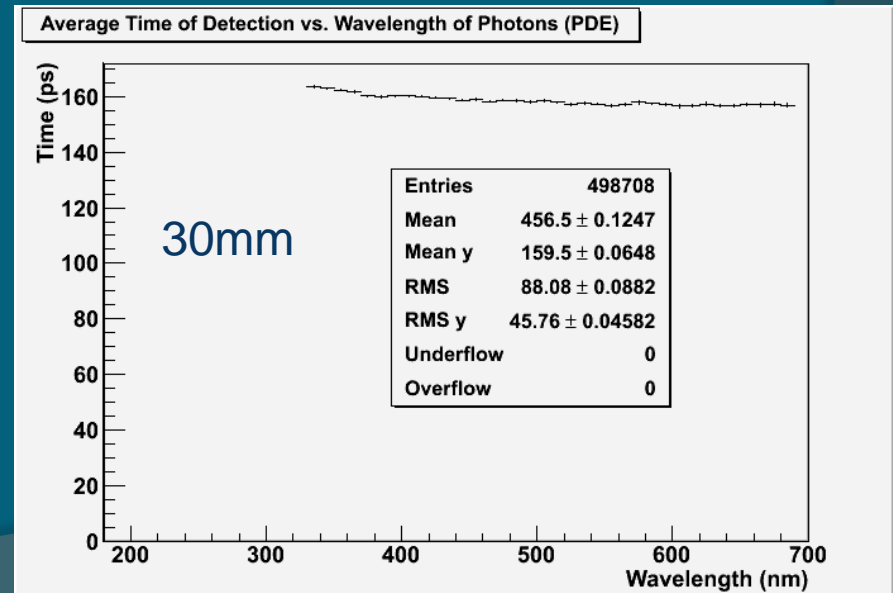
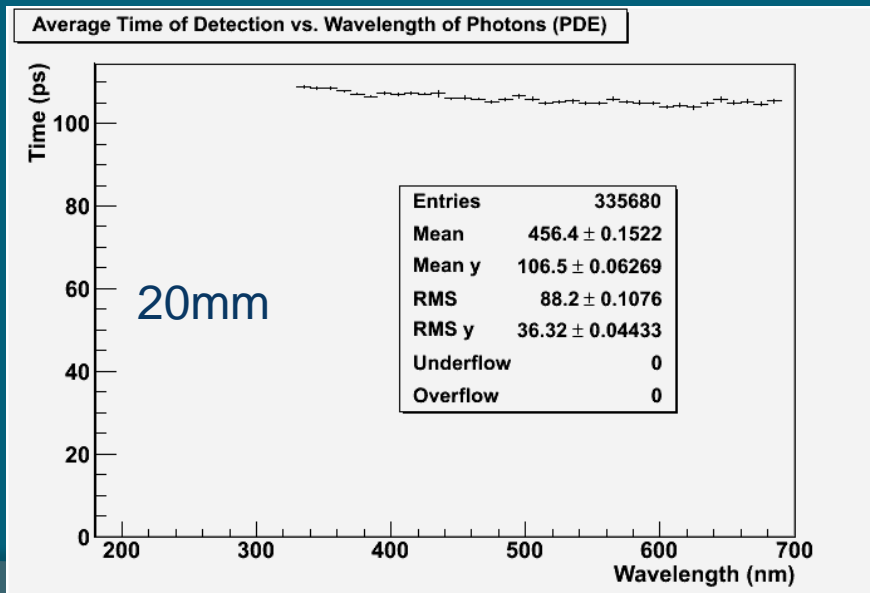
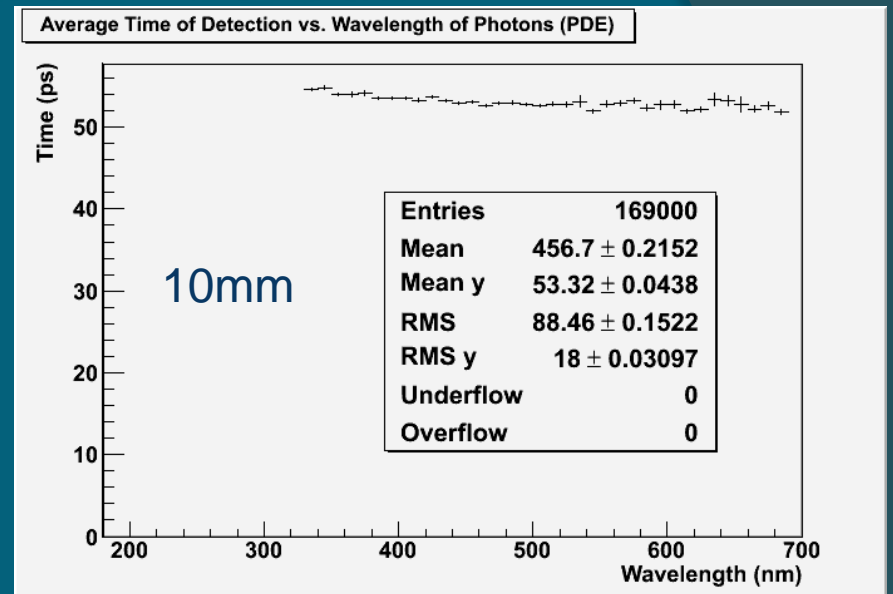
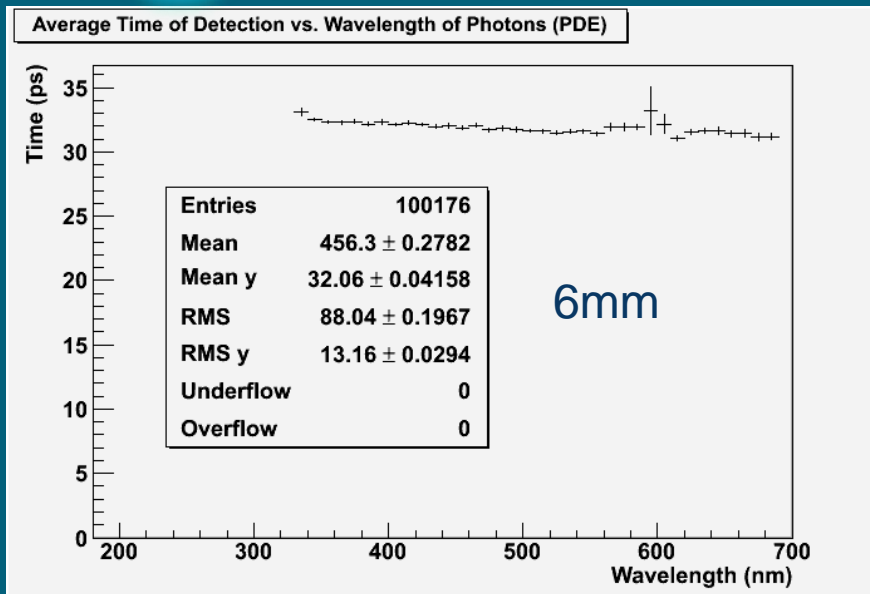
Average Time of Arrival vs. Wavelength of Photons at Detector



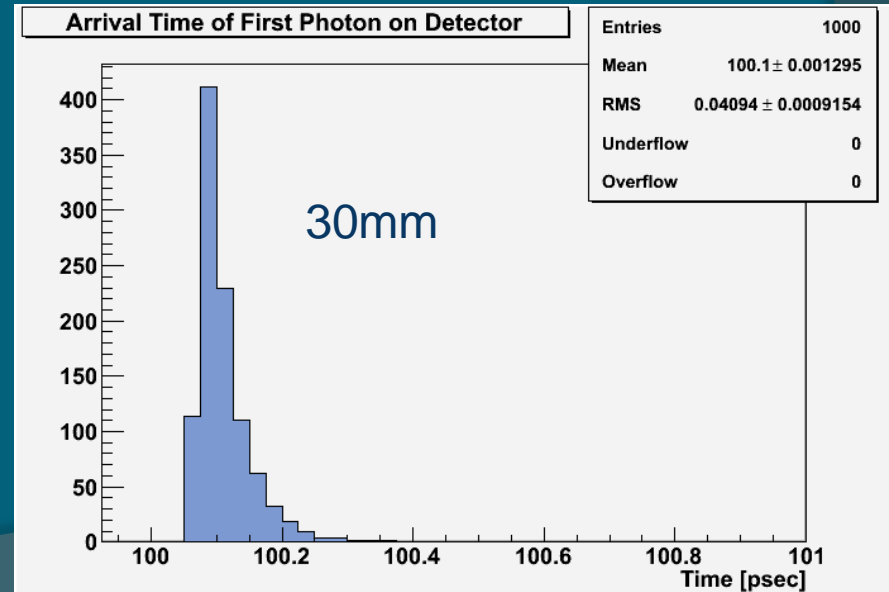
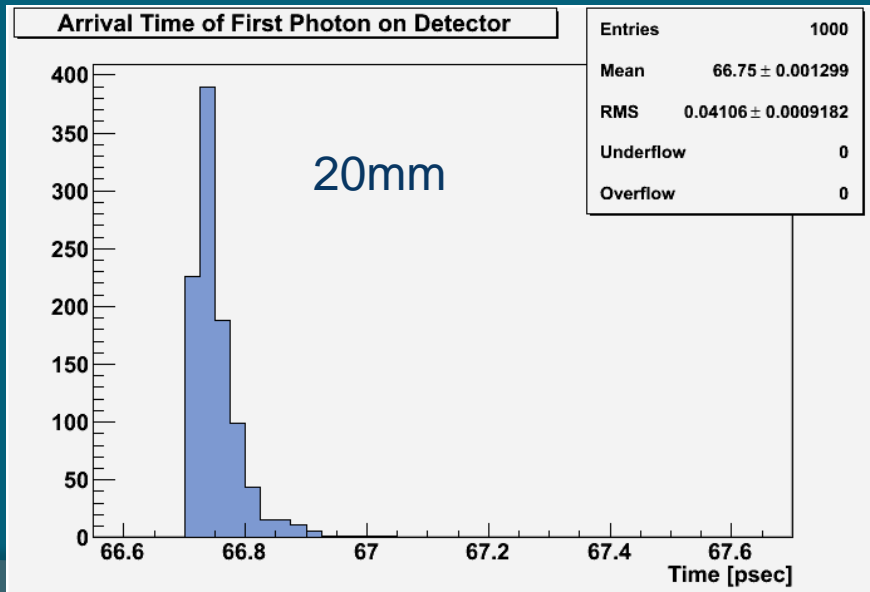
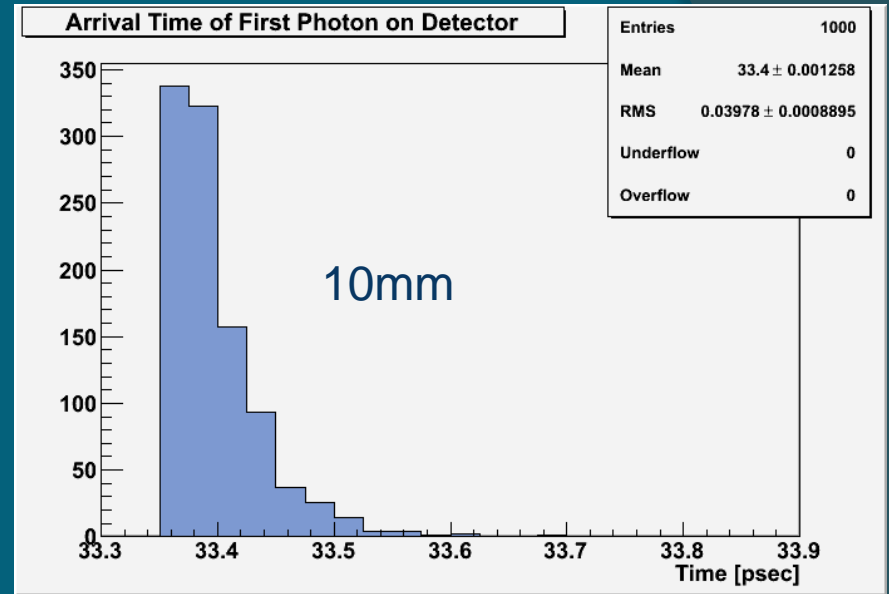
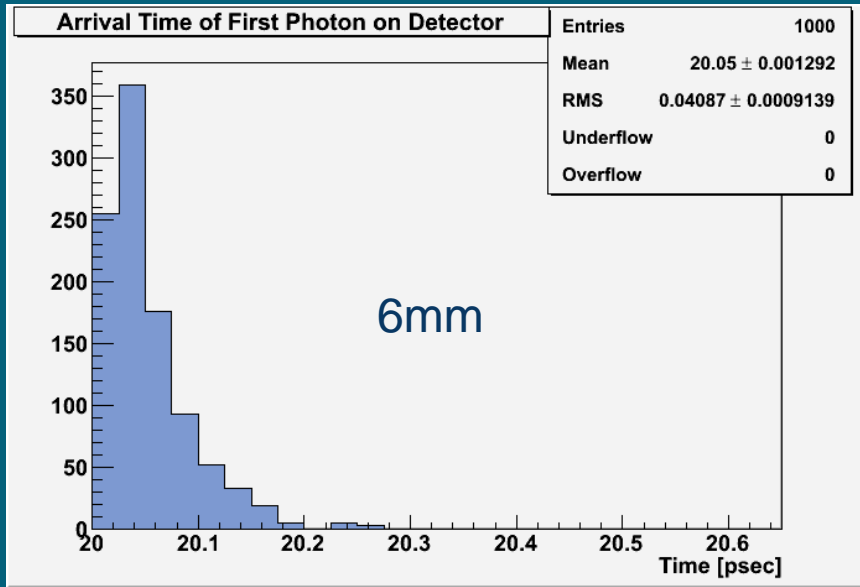
Detection Time vs. λ



Avg. Detection Time vs. λ

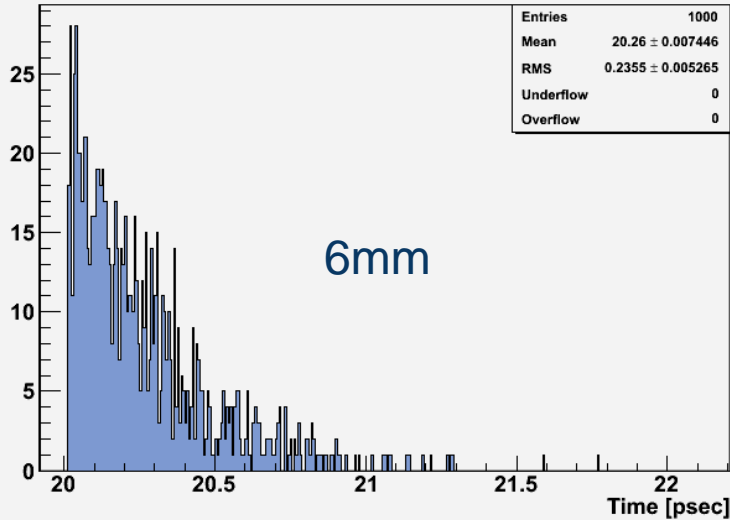


First Photon Times At Detector

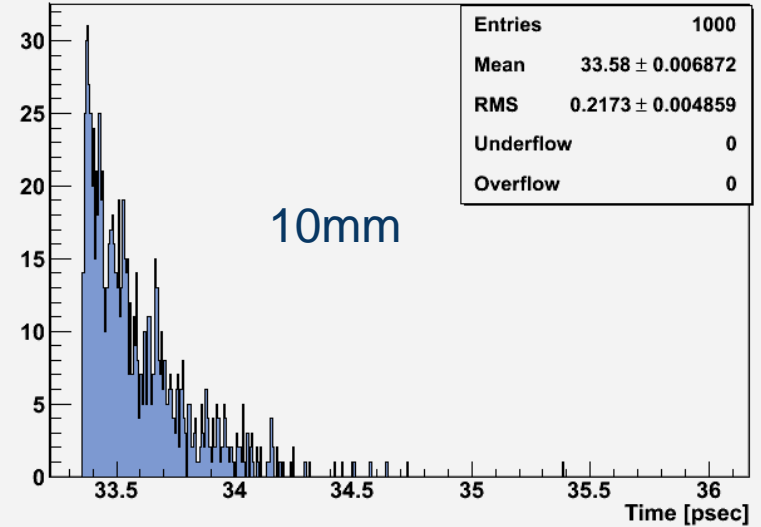


First Detected Photon Times

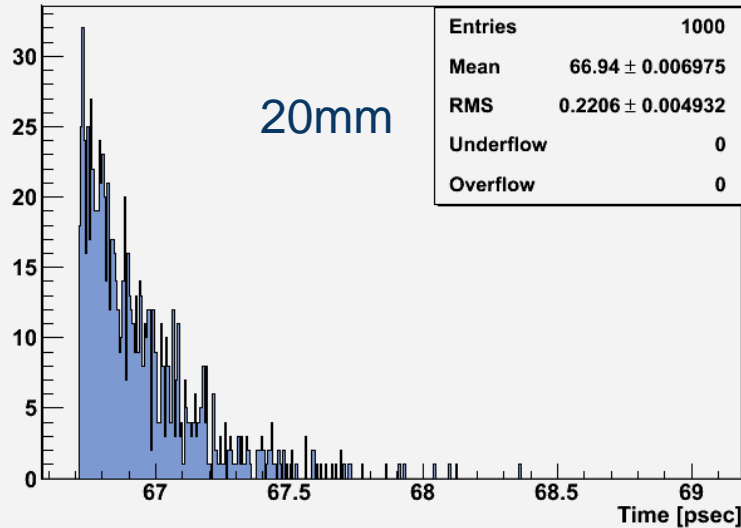
Arrival Time of First Photon on Detector (QEFF)



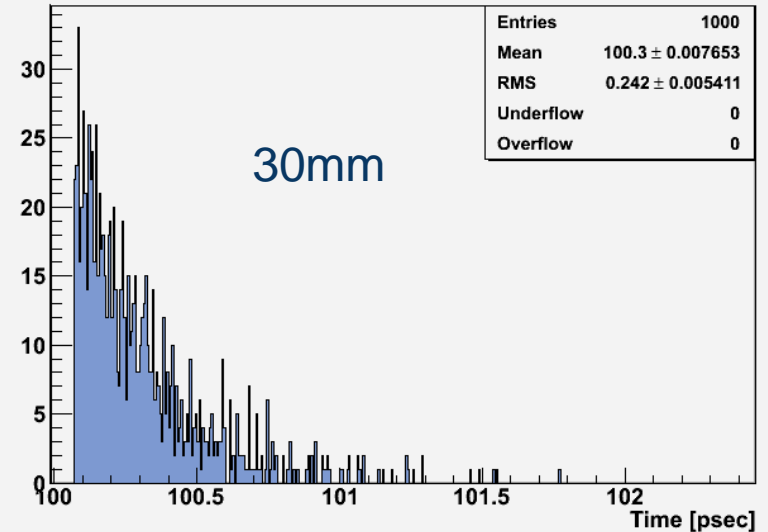
Arrival Time of First Photon on Detector (QEFF)



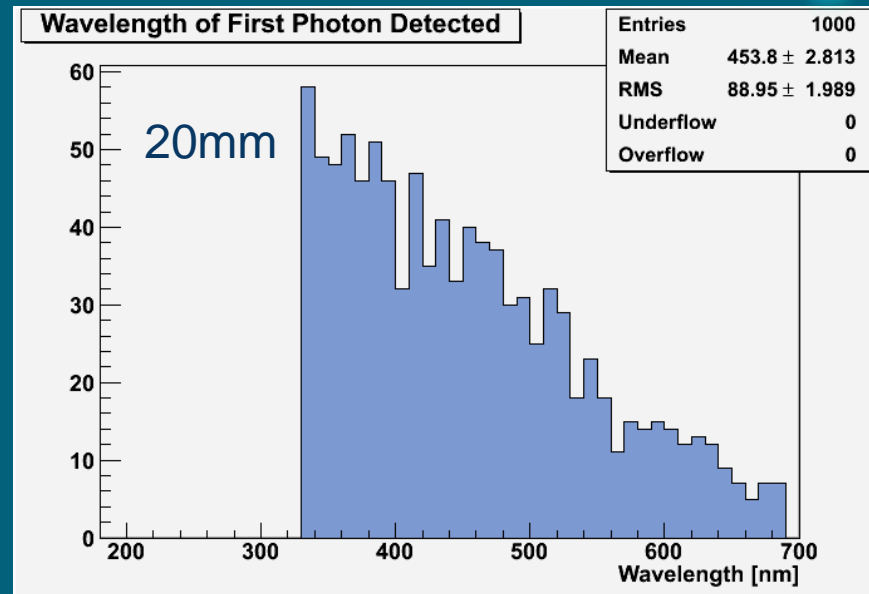
Arrival Time of First Photon on Detector (QEFF)



Arrival Time of First Photon on Detector (QEFF)



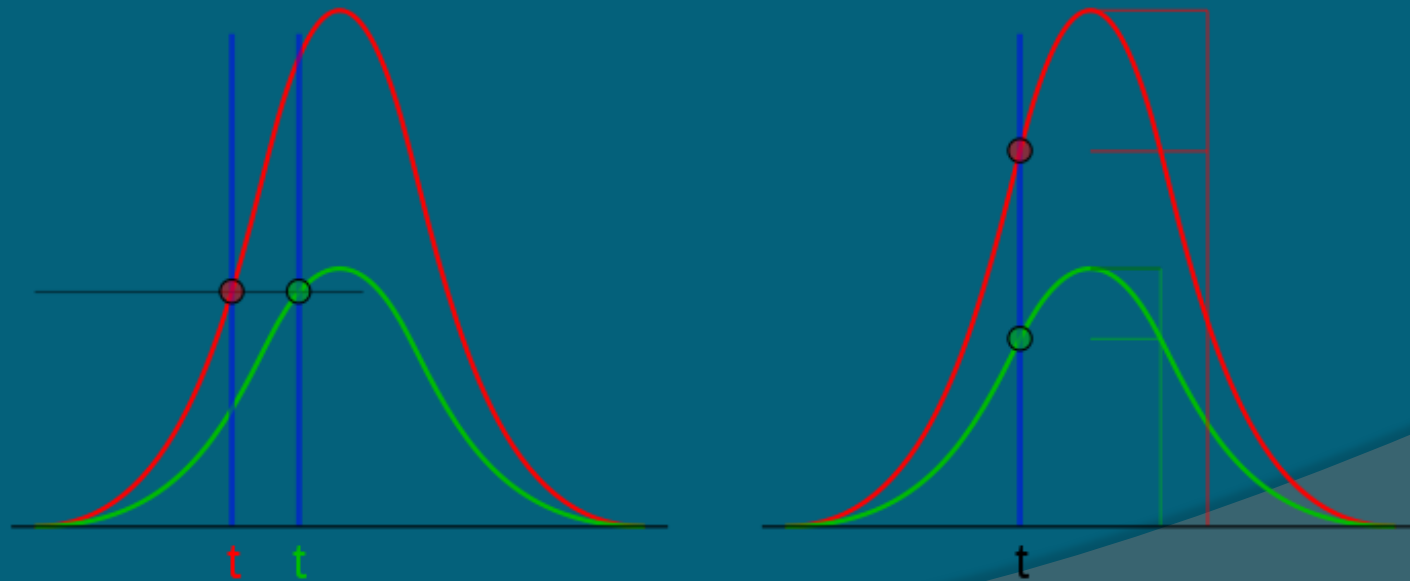
λ Dist. Of First Detected γ



	6mm	10mm	20mm	30mm
Protons	1000	1000	1000	1000
Mean	451.9±2.776	454.4±2.74	453.8±2.813	457.1±2.841
RMS	87.79±1.963	86.64±1.937	88.95±1.989	89.83±2.009
Underflow	0	0	0	0
Overflow	0	0	0	0

Coming Soon

- ⦿ CFD Timing with SiPM
- ⦿ Materials with differing “n”
- ⦿ Q-Bar Setup



Mike Albrow
Hans Wenzel
Earle Wilson

Thank You

