



CERN Beam Test 2026 Simulation

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To-do list

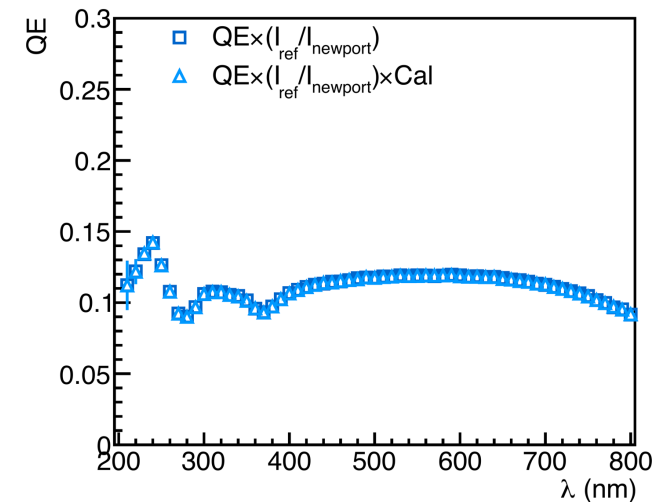
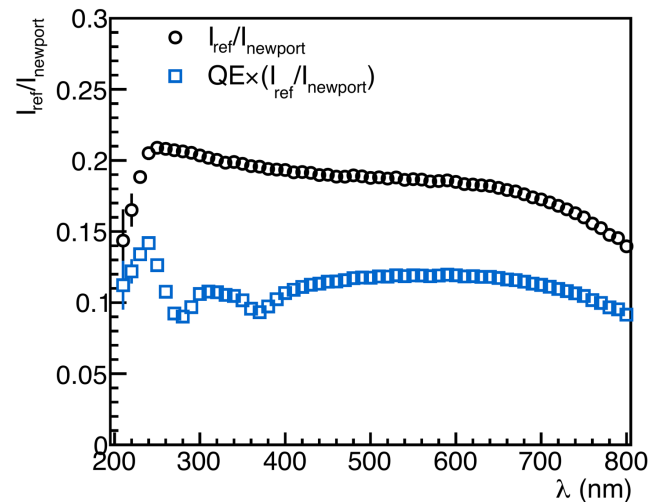
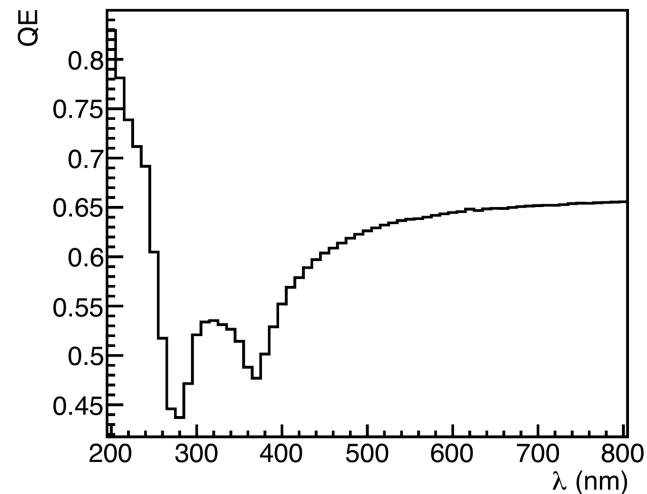
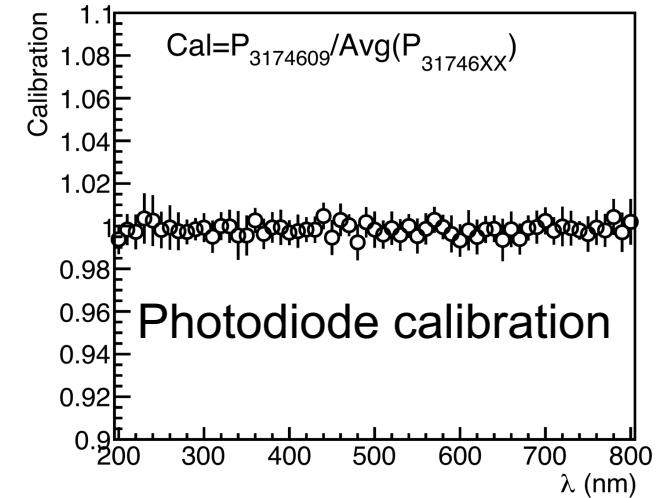
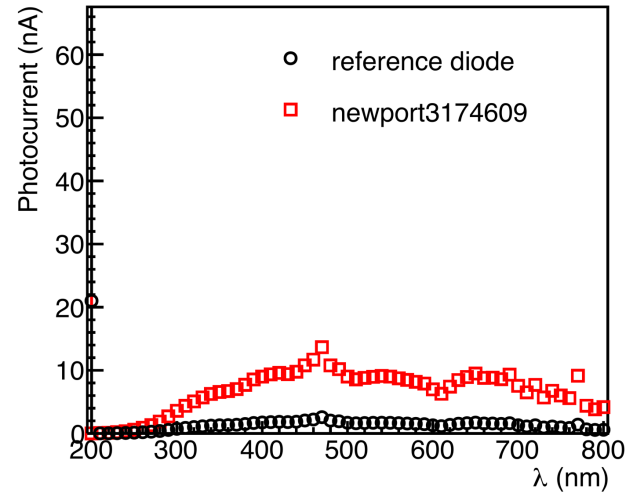
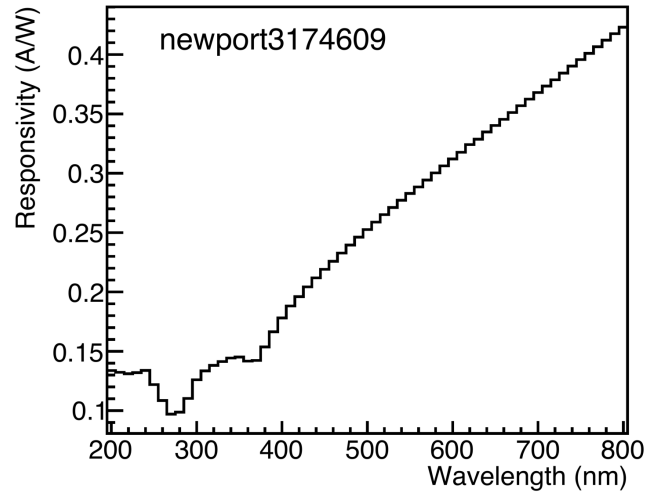
	Hardware measurements	Simulation update	Time scale
HRPPD	<input type="checkbox"/> QE uniformity ✓HRPPD 15 ✓HRPPD 16 ✓HRPPD 17 <input type="checkbox"/> HRPPD 23 (at Incom) <input type="checkbox"/> HRPPD 27		By May 1 st (4.5 hours per scan. Maximum two HRPPDs per day)
	<input type="checkbox"/> Gain uniformity <input type="checkbox"/> HRPPD 15 <input type="checkbox"/> HRPPD 16 <input type="checkbox"/> HRPPD 17 <input type="checkbox"/> HRPPD 23 (at Incom) <input type="checkbox"/> HRPPD 27		
			<input type="checkbox"/> Implement updated QE(λ) in simulation using photocurrent from Chandra
Aerogel		✓Thickness ✓Absorption length <input type="checkbox"/> Refractive index	
UV filter		Material definition (change from acrylic to borosilicate)	
	✓ Remeasure absorption length	<input type="checkbox"/> Absorption length	
Beam spread		<input type="checkbox"/> Option for beam spread angle <input type="checkbox"/> Option for beam diameter	
Analysis macros		✓Hit maps <input type="checkbox"/> QA plots	
Large scale simulation		<input type="checkbox"/> Run script, condor script ✓Options for particle species (π , K), and momentum	

Update 1 – Github Repository

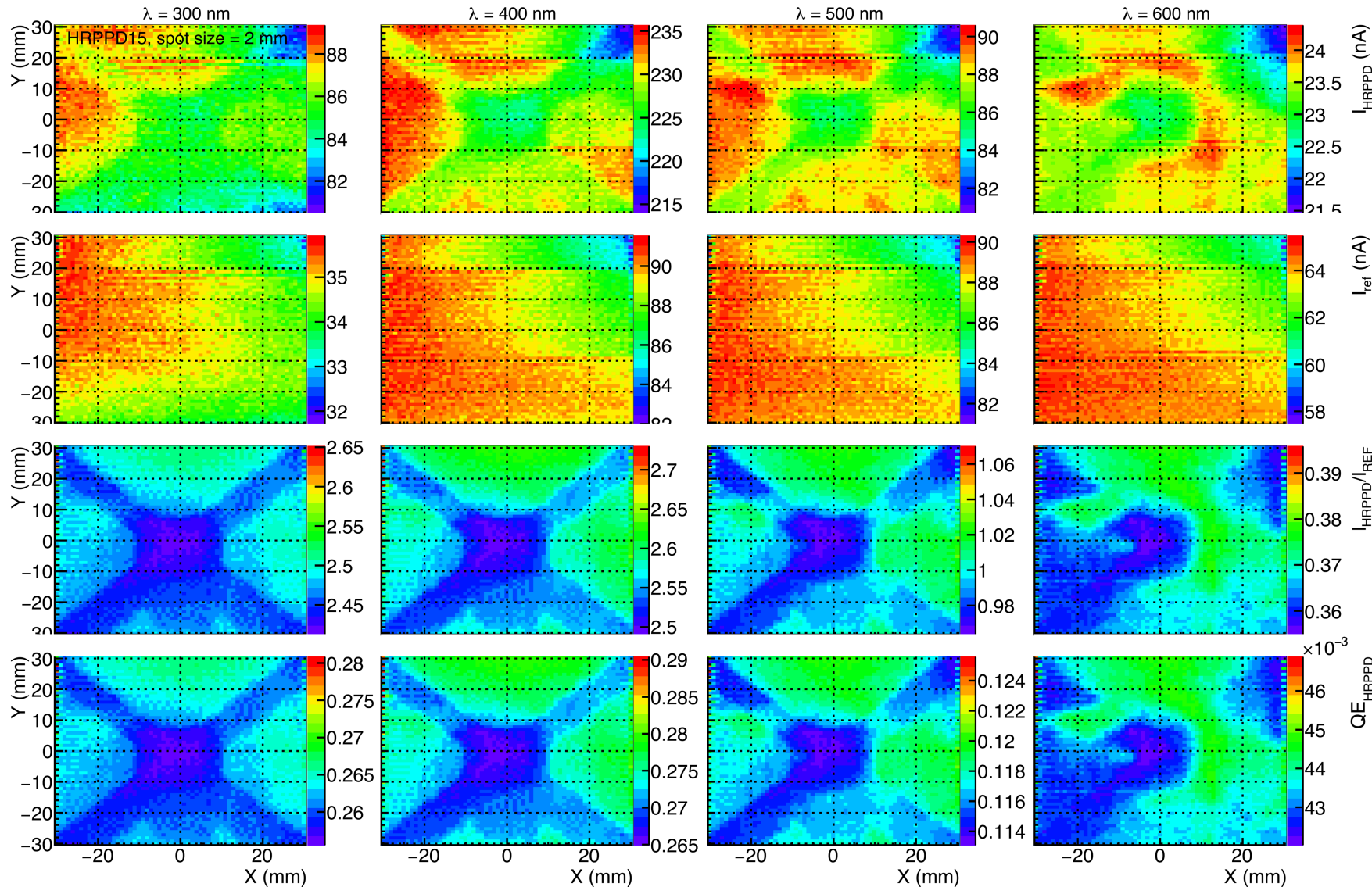
- <https://github.com/eic/pfRICH/tree/CERN2026>
Do **NOT** merge to the main branch!!!
- Follow README.CERN for installation instructions
- `$./pfrich-cern --part pi+ --mom 7 --agel tsa114_3 --s 1000`
 - `--part` : pi+, kaon+
 - `--mom` : in GeV/c
 - `--agel` : tsa114_3, tsa120_1, tsa120_2
 - `-s` : number of events

Update 2: HRPPD QE Measurements

Scaled photodiode with its own calibration

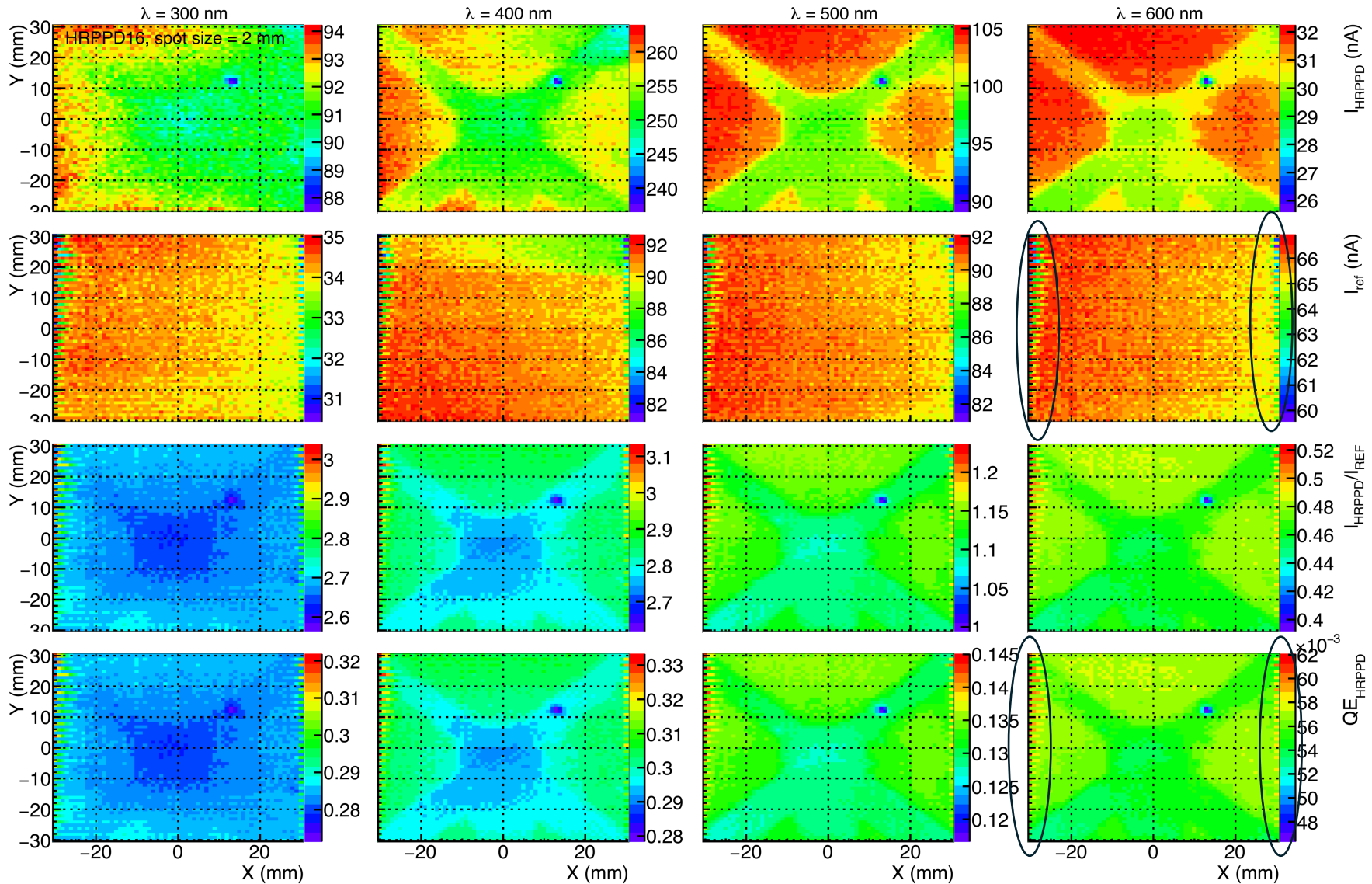


Update 2: HRPPD QE Measurements



HRPPD 15 (updated)
Subtracted dark current

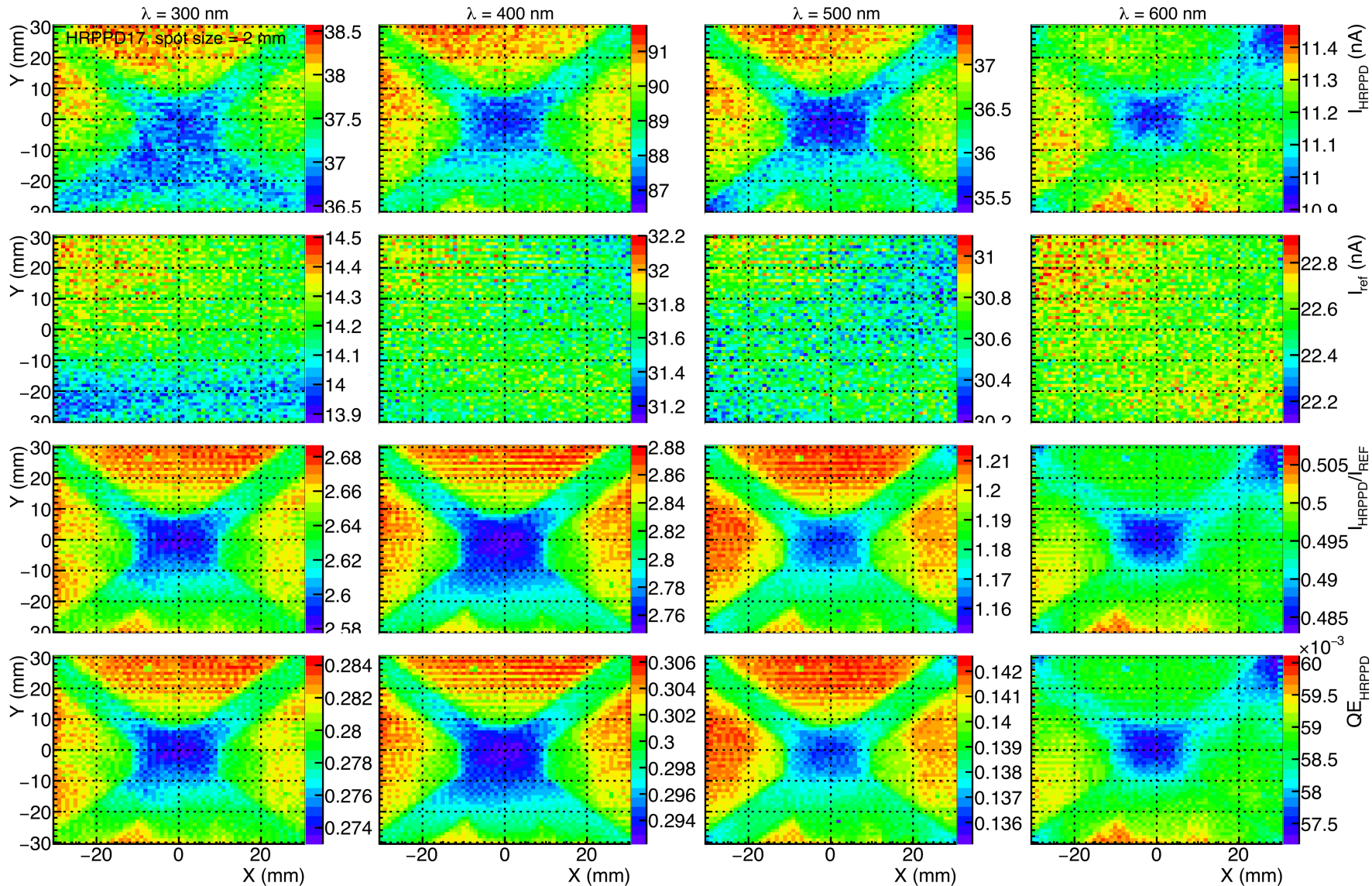
Update 2: HRPPD QE Measurements



HRPPD 16 (NEW)
No dark current subtraction

- Hot spots on left and right edges or artifact from the reference diode?
- One cool spot observed

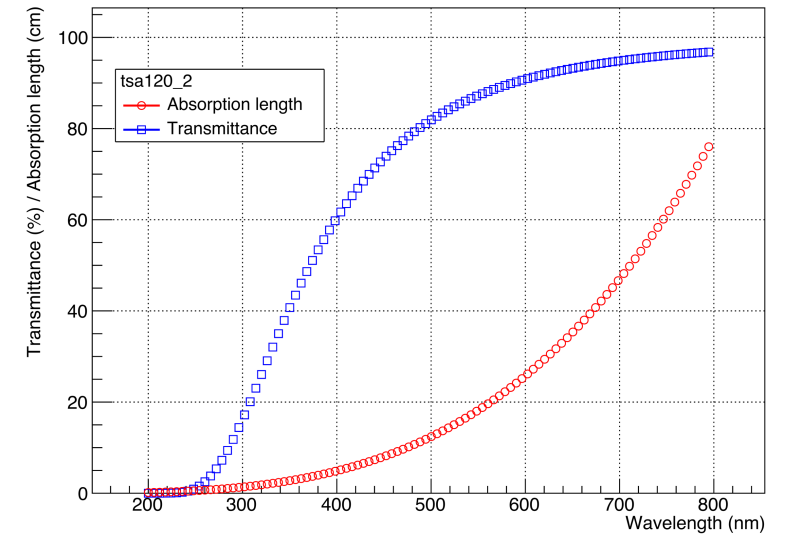
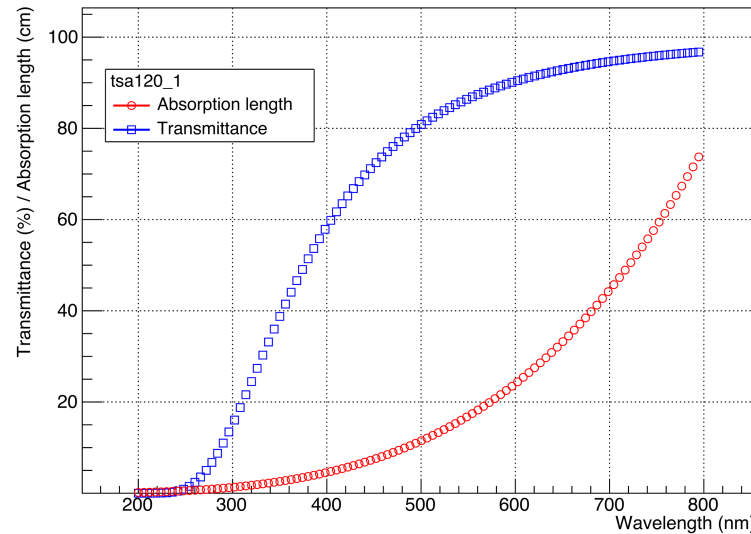
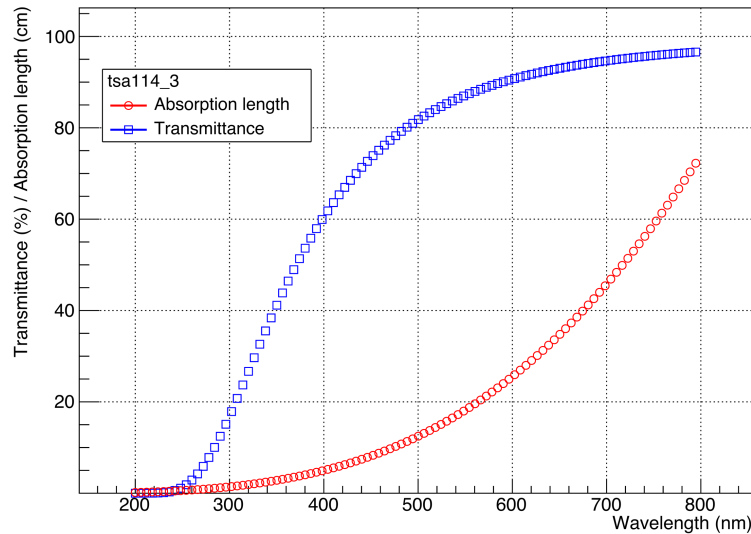
Update 2: HRPPD QE Measurements



HRPPD 17 (updated)
Subtracted dark current

Update 3 – Aerogel Absorption Length

$$\text{Absorption} = - \frac{\text{thickness [cm]}}{\ln(\text{Transmittance})}$$



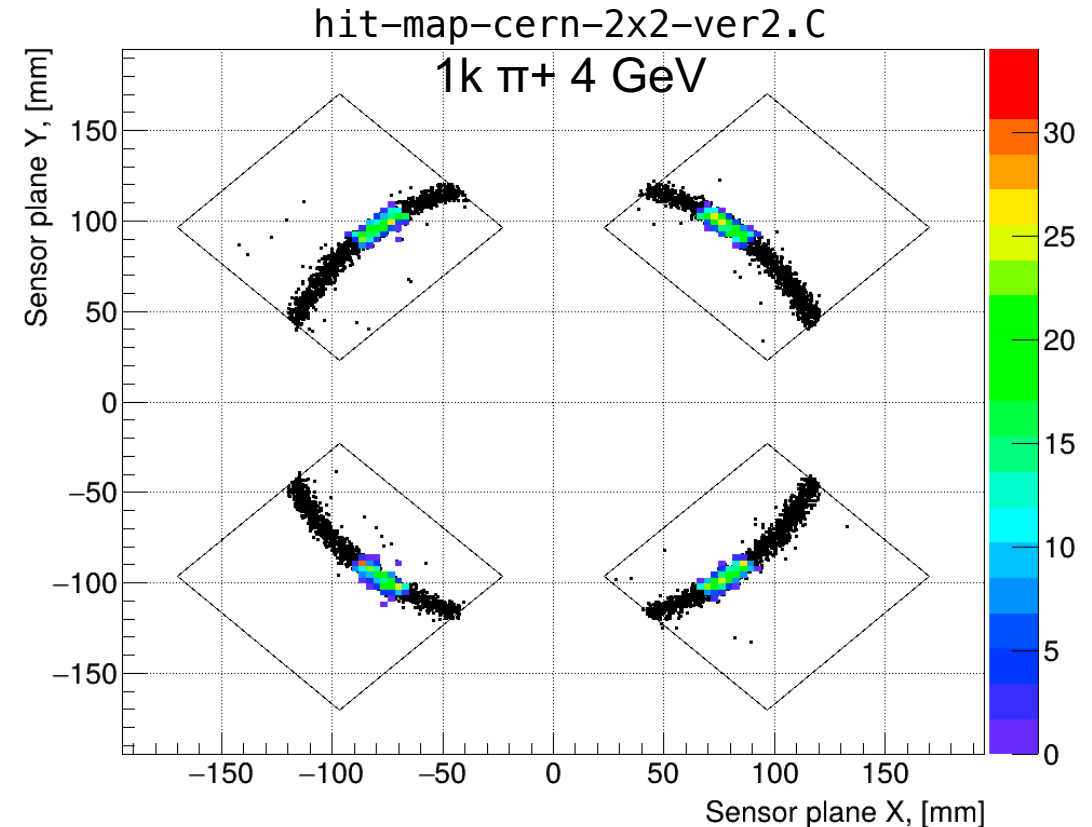
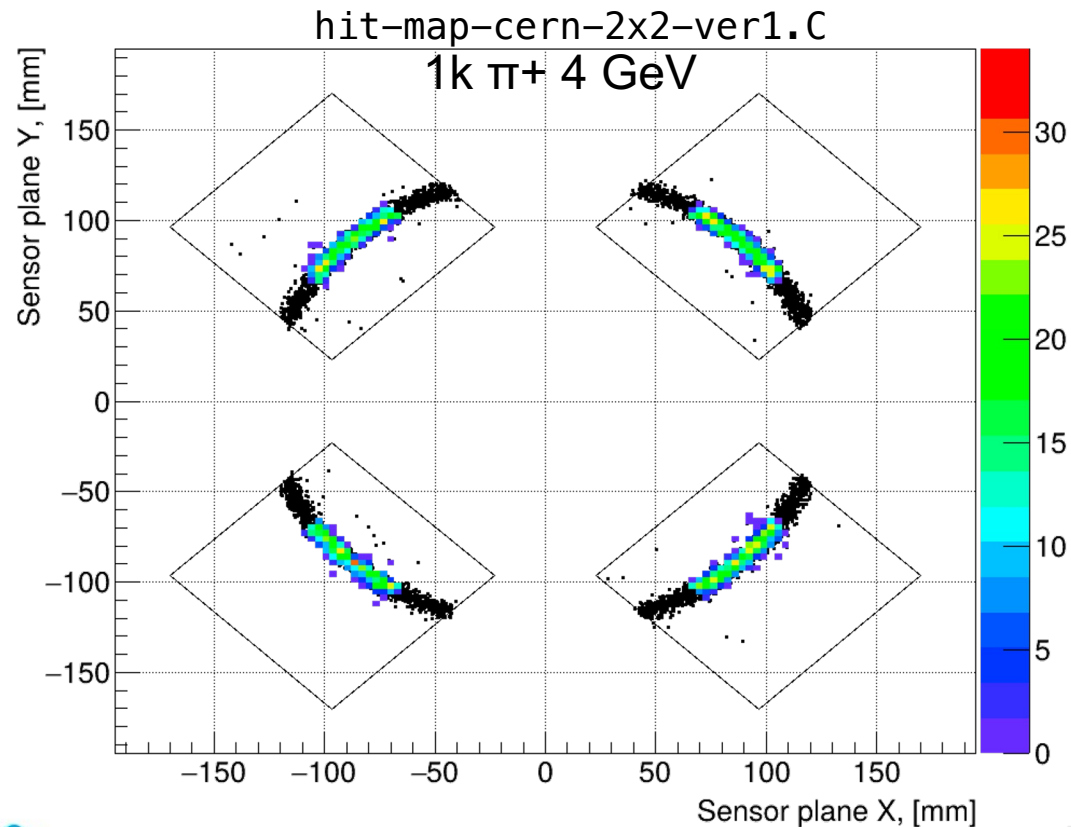
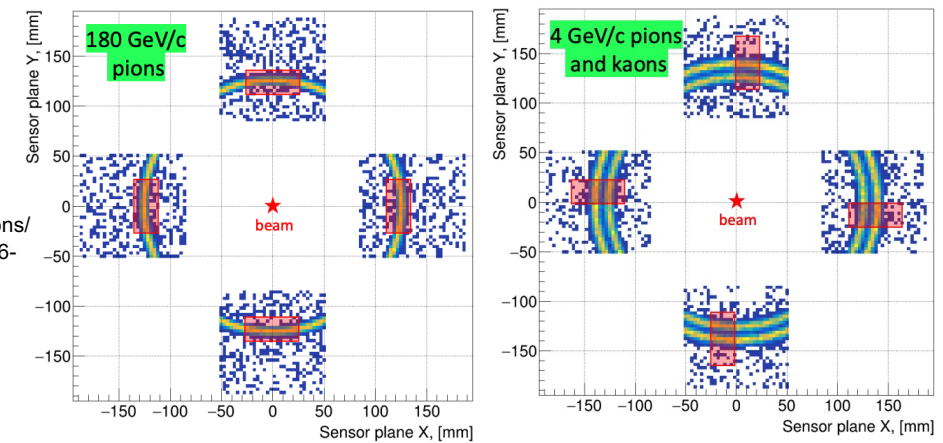
- Received the transmittance curves of three aerogel tiles from Matt Posik
- Matt also provided thickness of each tile and the refractive index at $\lambda = 405$ nm

Update 4: Hit Maps

- Rotate hits by 45 degrees
- Square – HRPPD area
- Black markers – all hits
- Colored markers – all hits on the active area

Initial hit map layout

<https://indico.bnl.gov/event/32214/contributions/122195/attachments/69054/118510/ayk-2026-03-26-pfrich-meeting-cern-beam-tests.pdf>



Question: Single Photon QA Plots

Including hits in the non-active area

