Phase space analyses
&
Cherenkov ambiguity PDF
&
Polar angle error estimation

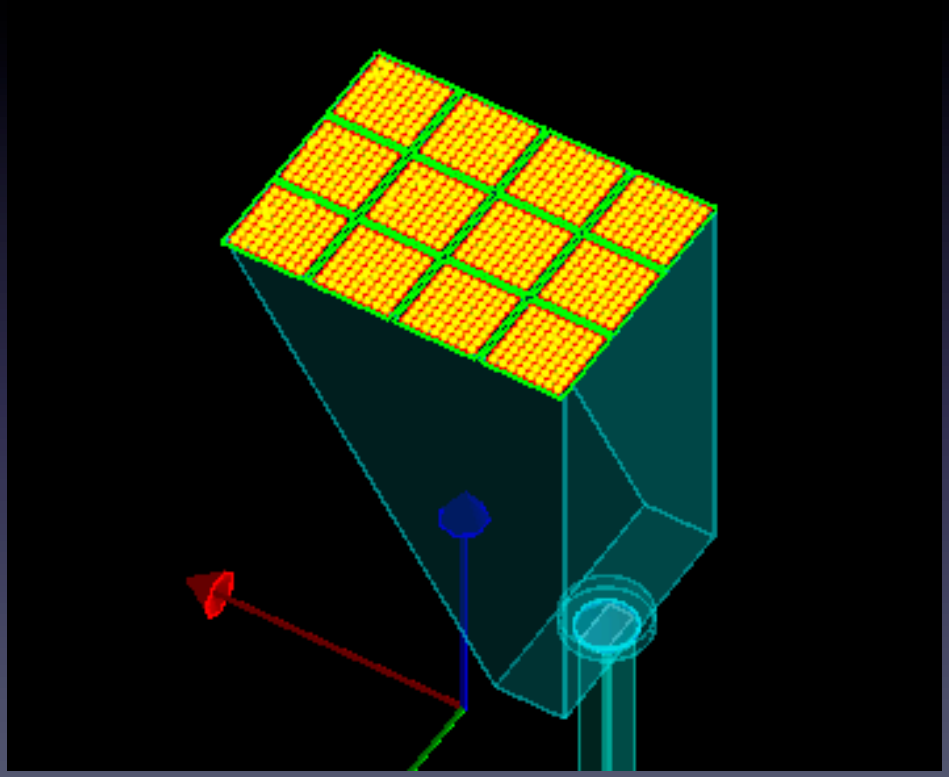
A.A

Weekly DIRC Meeting

28 Jun 2018

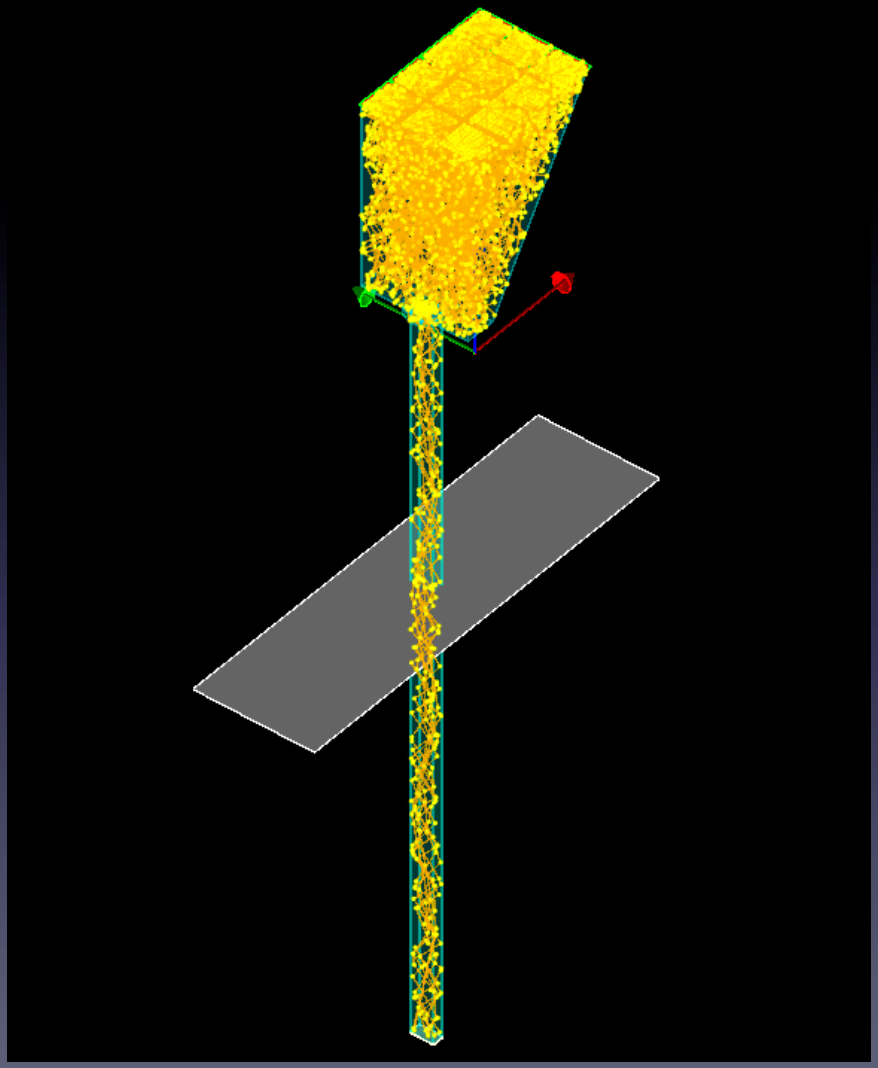
Phase Space or (backward LUT)

- Step1: instead of using one lookup table (LUT) generated by using a photon source positioned at the end on the radiator to illuminate the entire MCP-PMTs pixels, rather one can use the inverse way by simulating point-like photon source at each pixel to illuminate the "radiator".



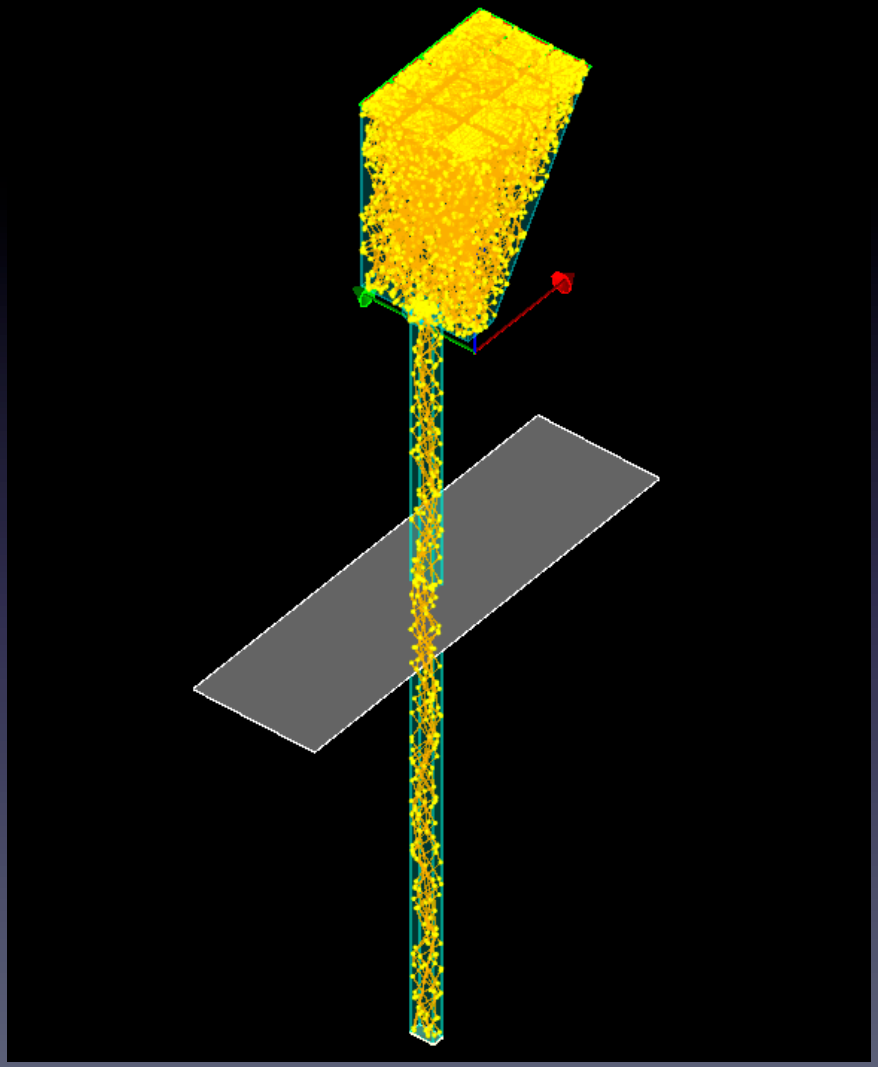
Phase Space or (backward LUT)

- Step 2: create a phase space PhS as a plane and place it along the particle path inside the radiator, which can store photon directions, pixel number and photon time from all sources.
- The PhS can store direct and reflected photons



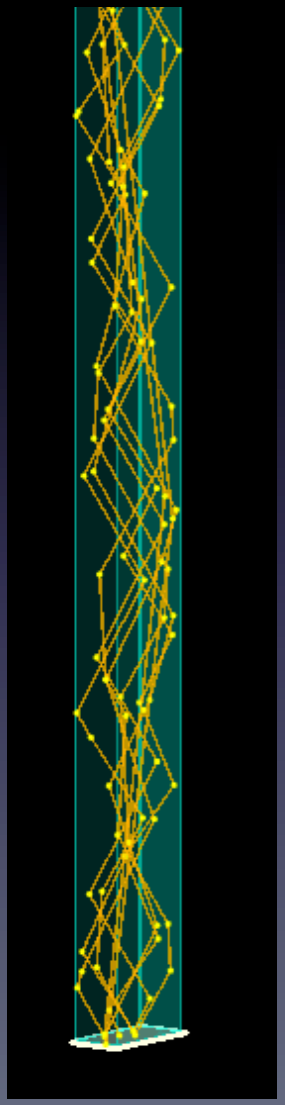
Phase Space or (backward LUT)

- Step 3: match information from the DIRC using an real hits with information from PhS
- Step 4: apply custom time cuts per pixels to reject the low probable ambiguities
- Step 5: Cherenkov angle reconstruction by calculating the angle between particle track direction and photon directions form the PhS solutions.



Phase Space or (backward LUT)

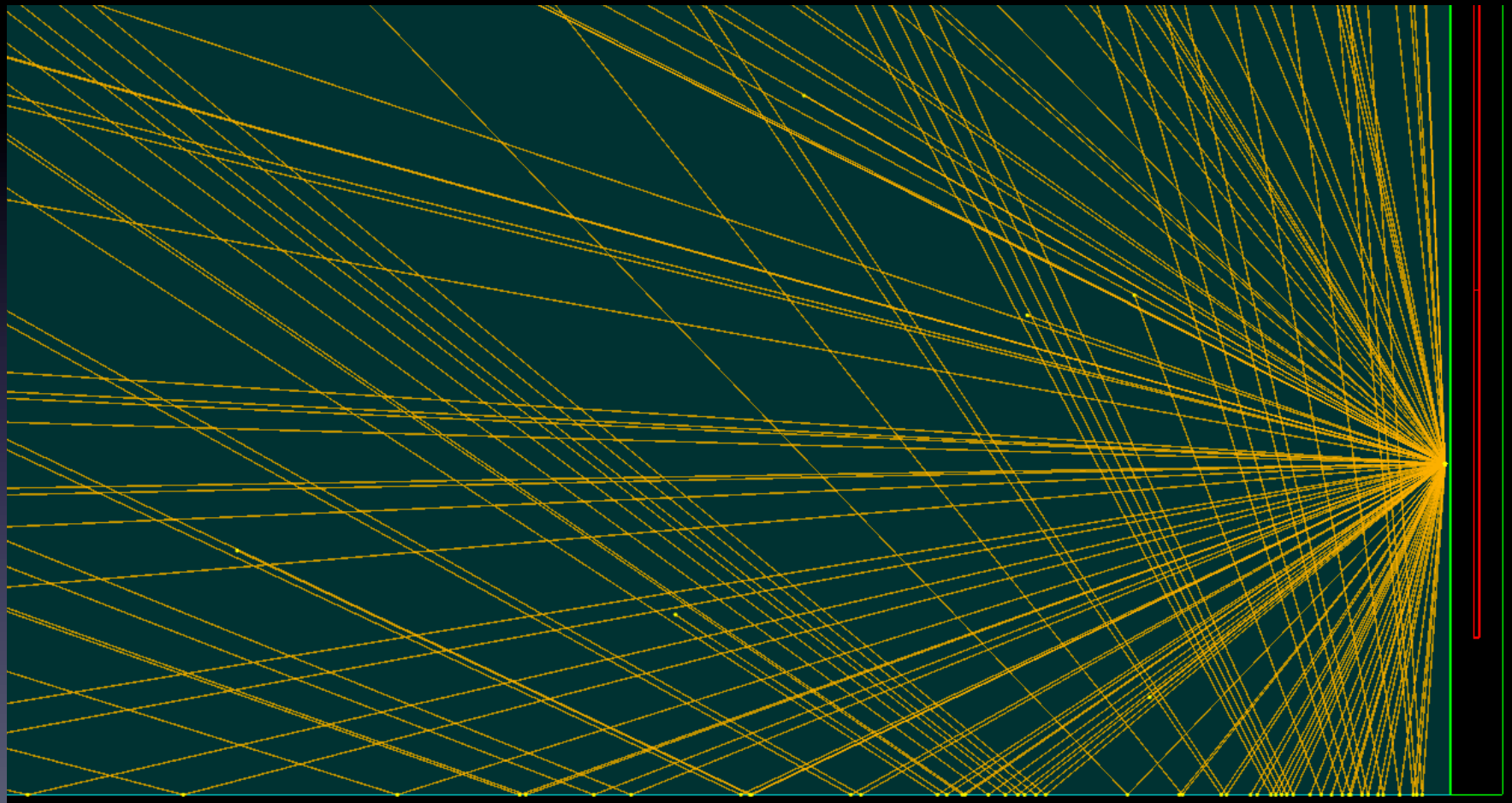
- Step 6: Make generalization, instead of using phase space as a plane, one can use a bulk phase space cover the entire bar



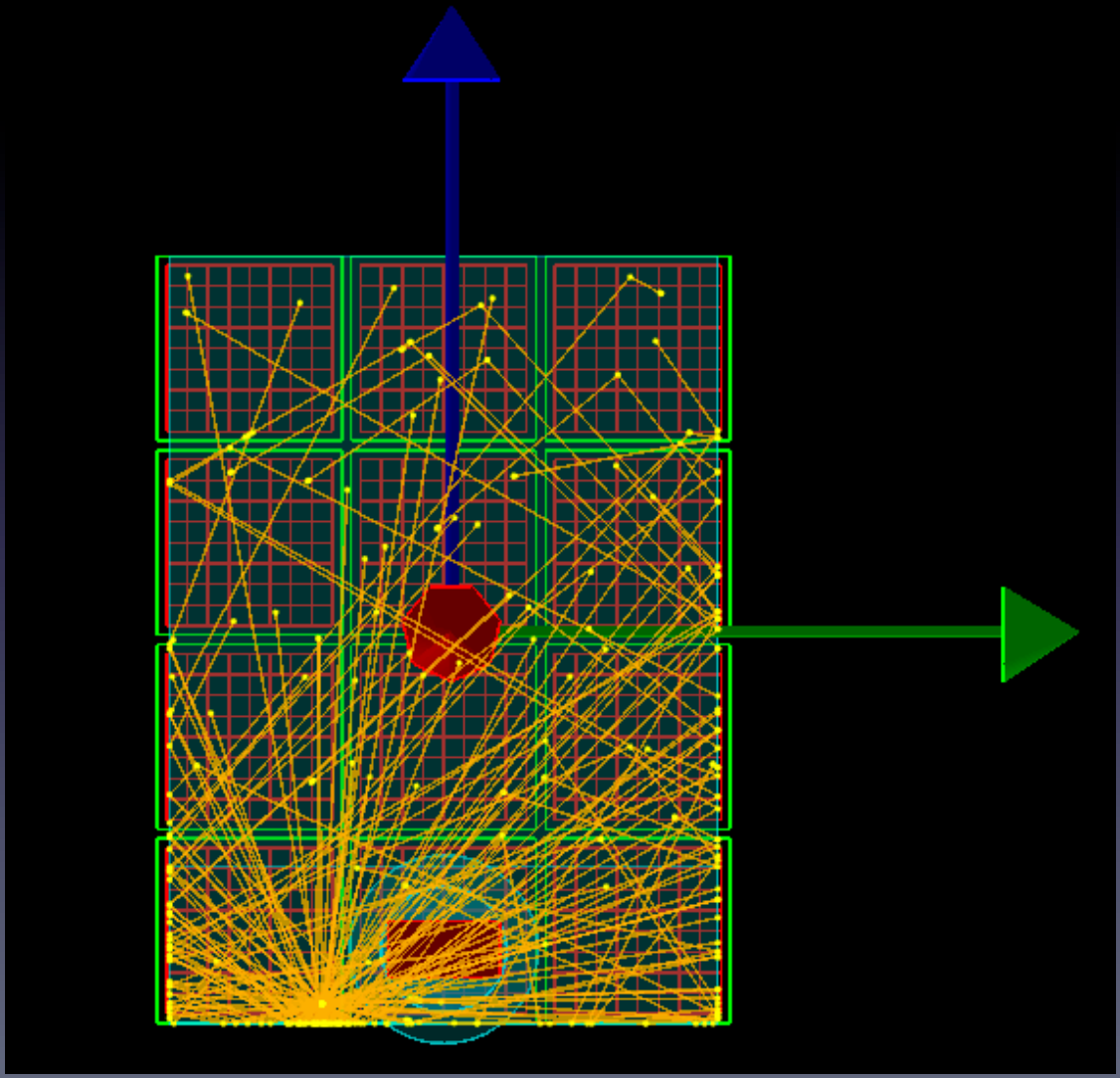
Road Map

- Photon sources alignment (done)
- PhS Plan (done)
- Reco algorithm will use the same infrastructure of the Geometrical reconstruction (coming soon)
- PhS bulk

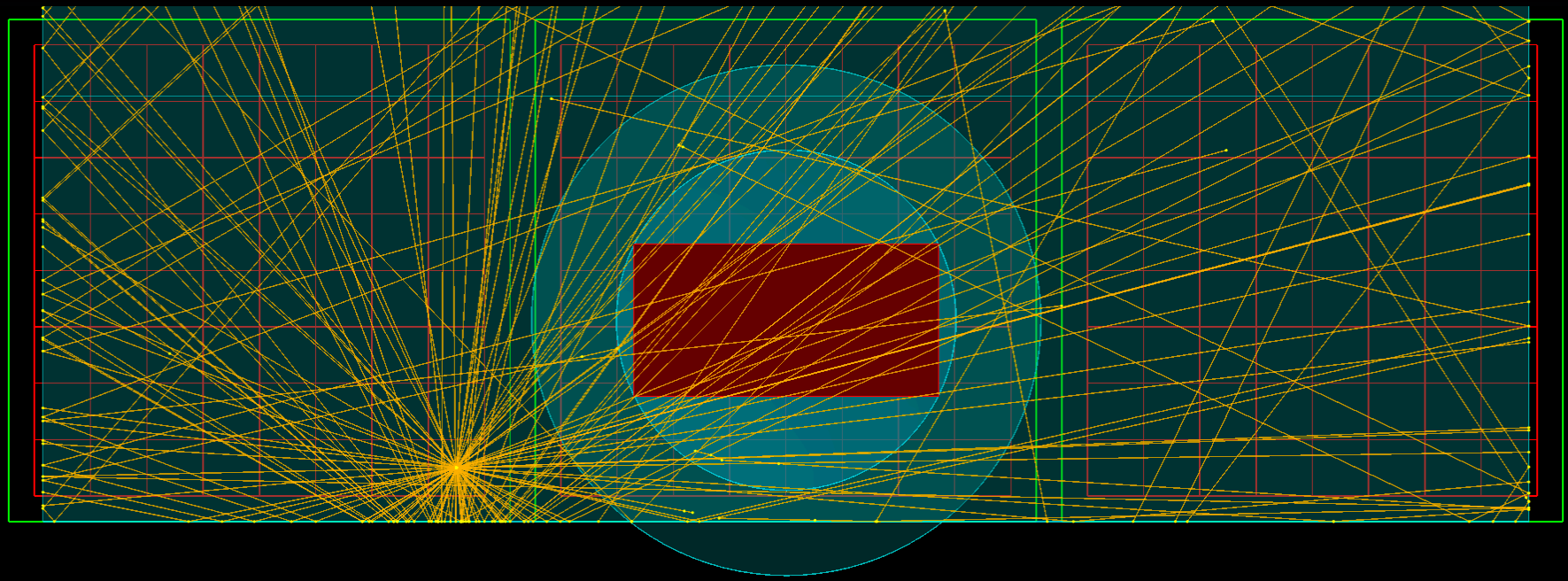
Source direction randomization



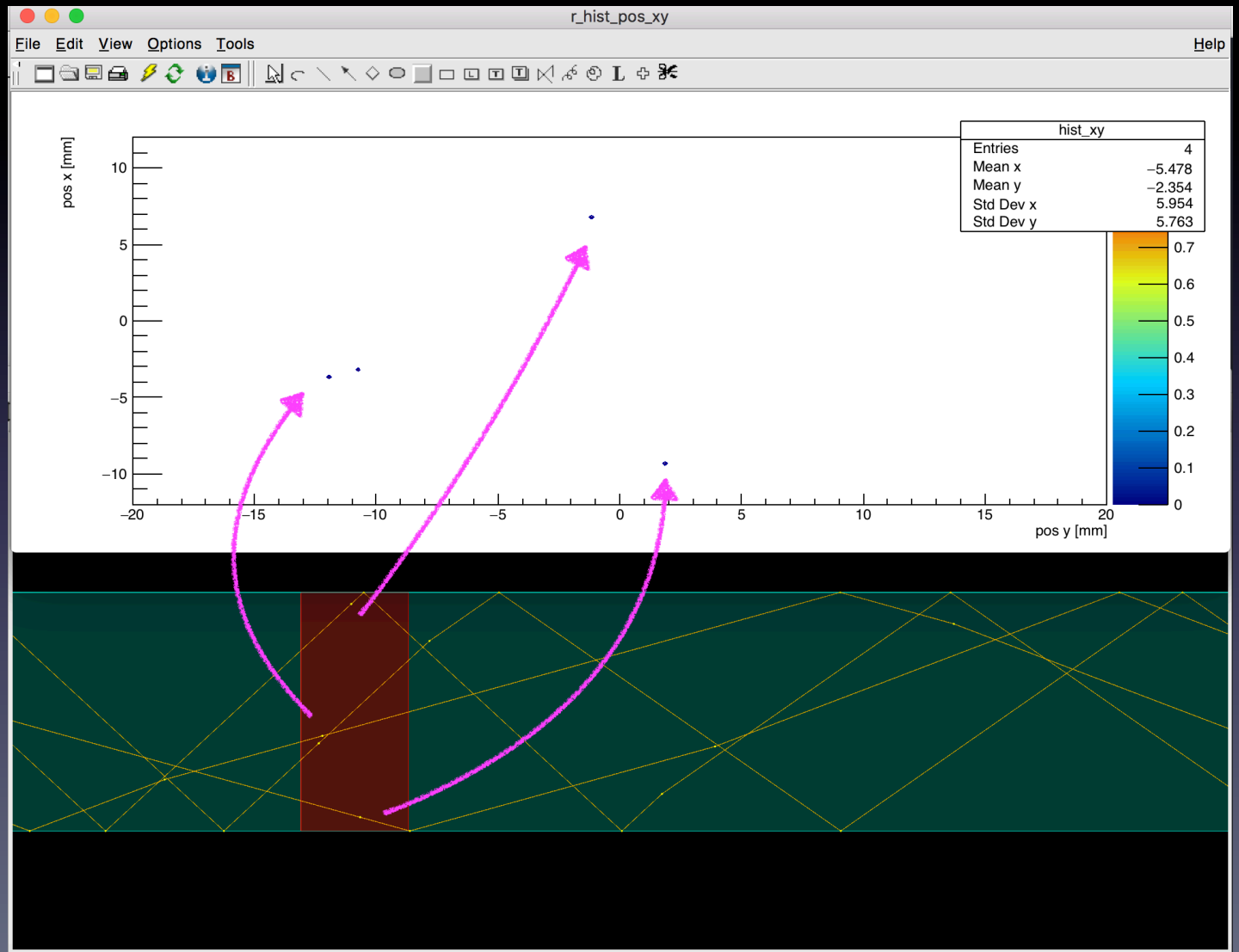
Source direction randomization



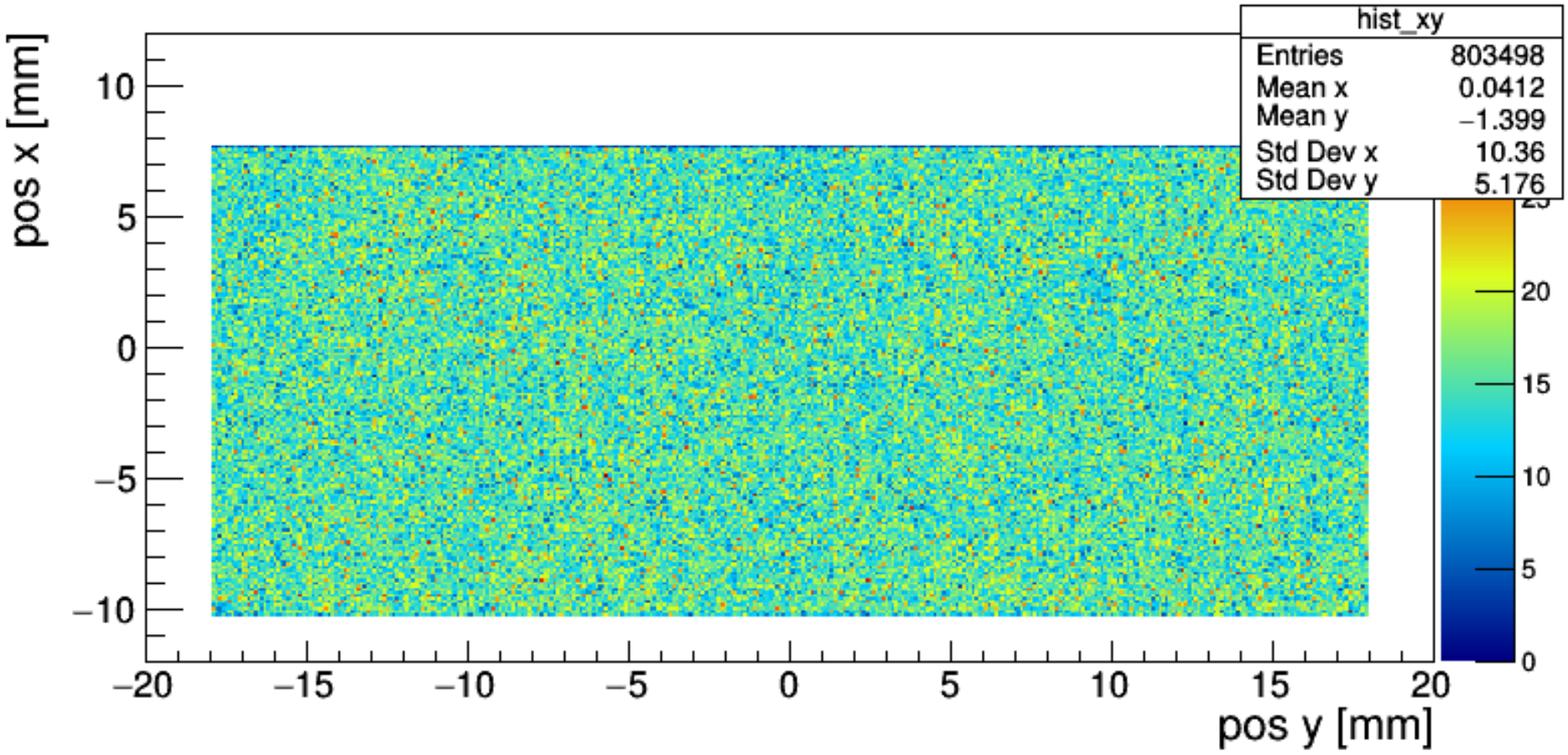
Source direction randomization



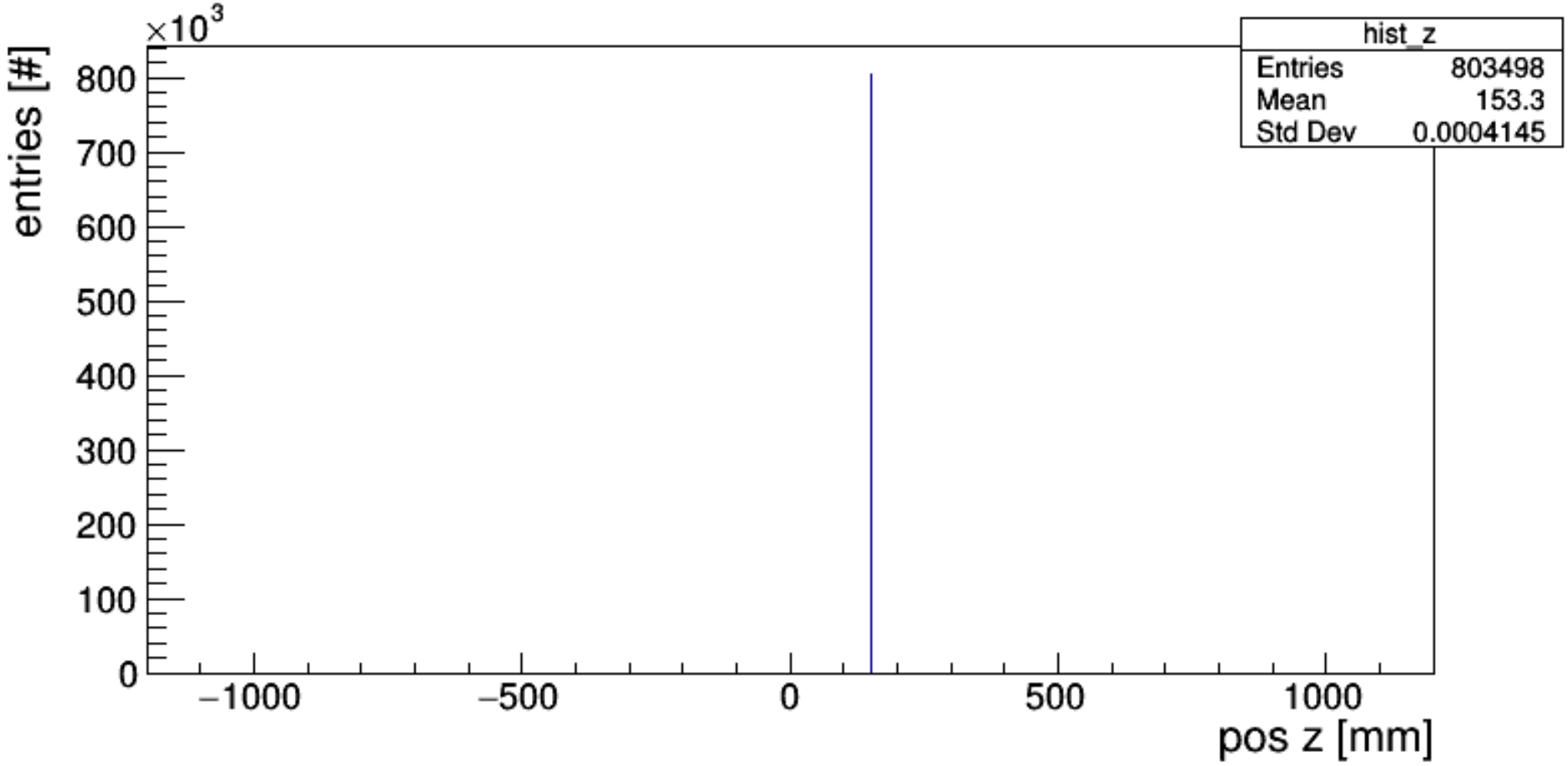
PhS Hit position



Phs Analysis



Phs Analysis



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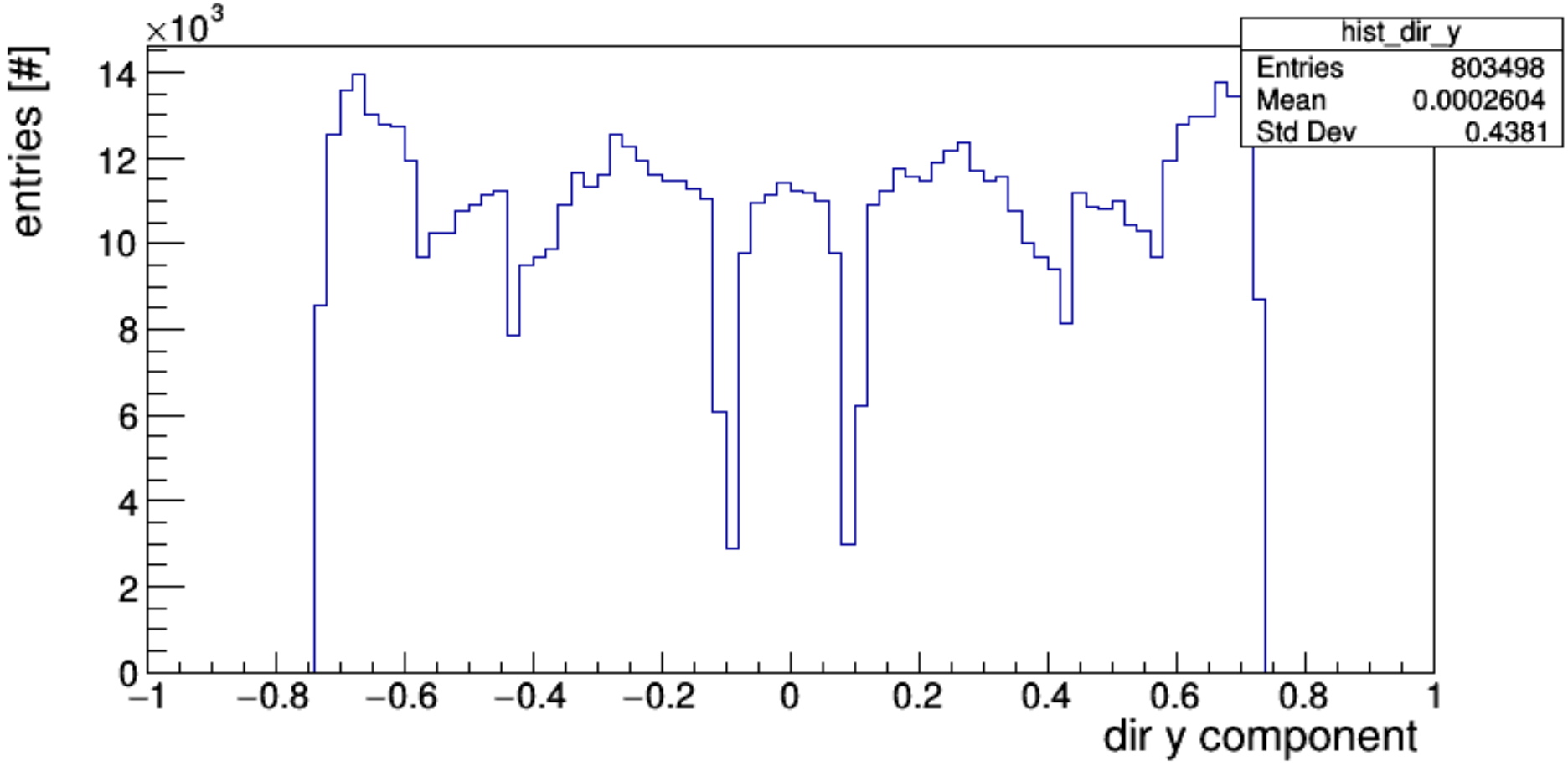

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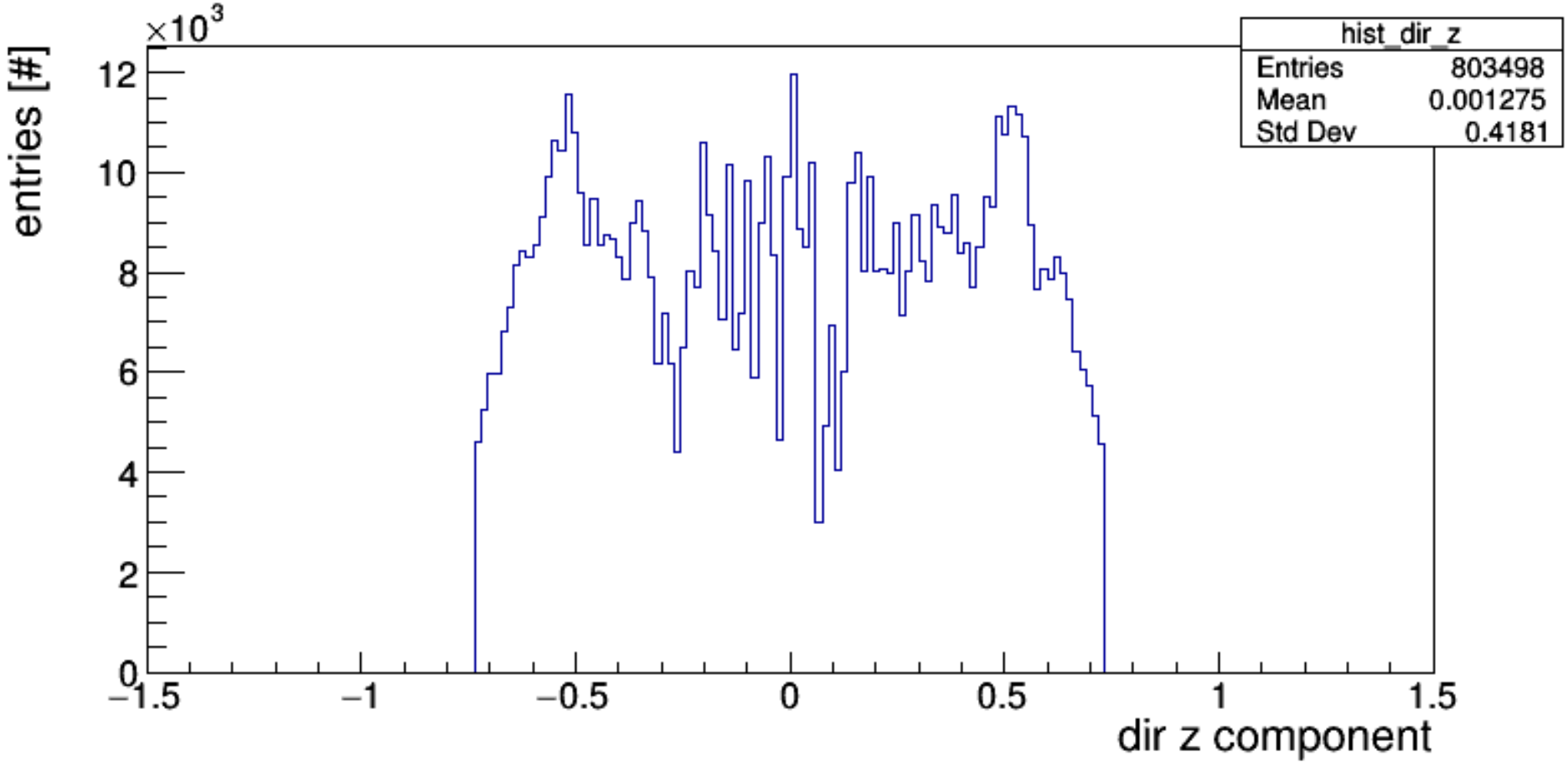

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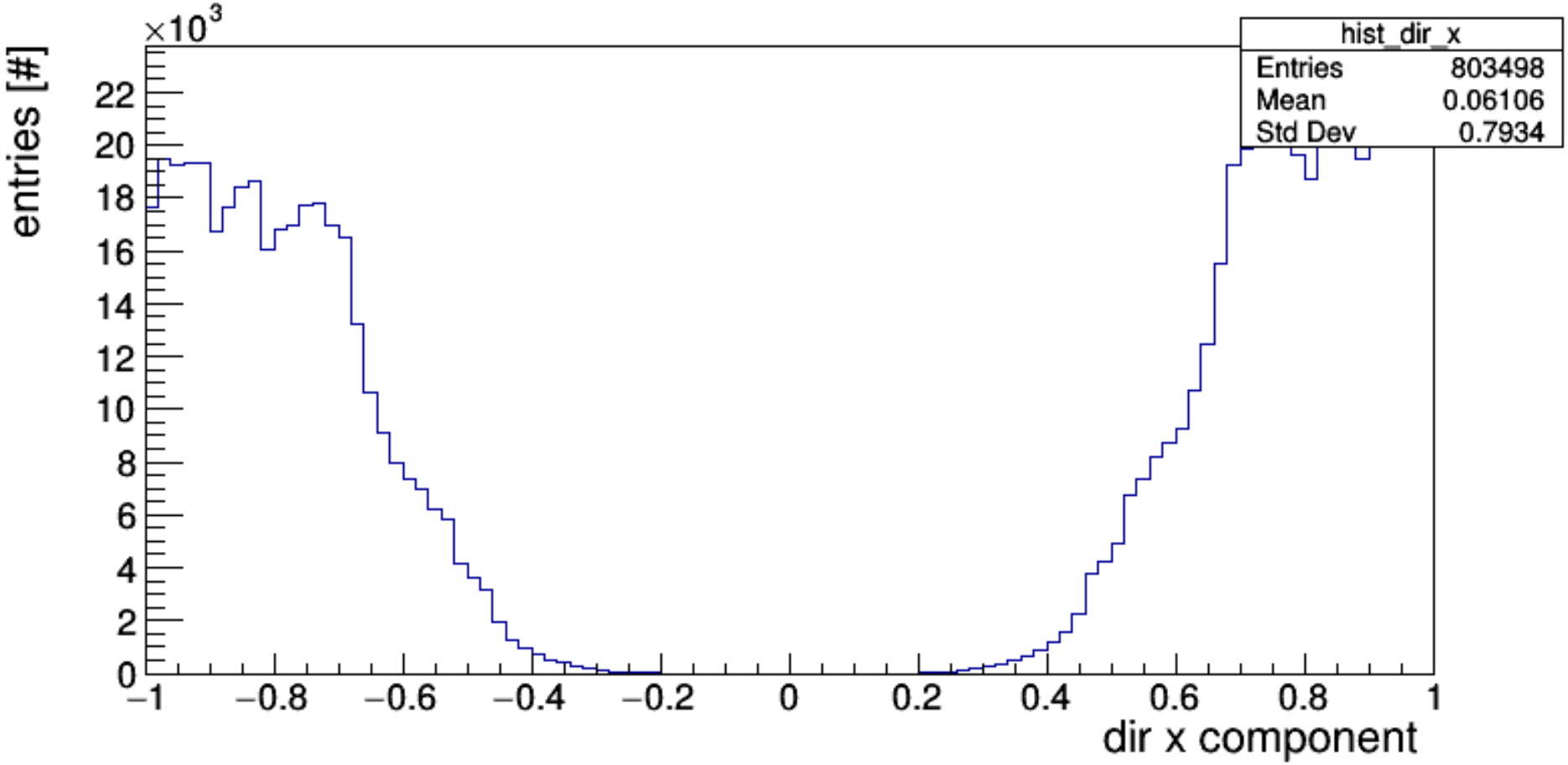

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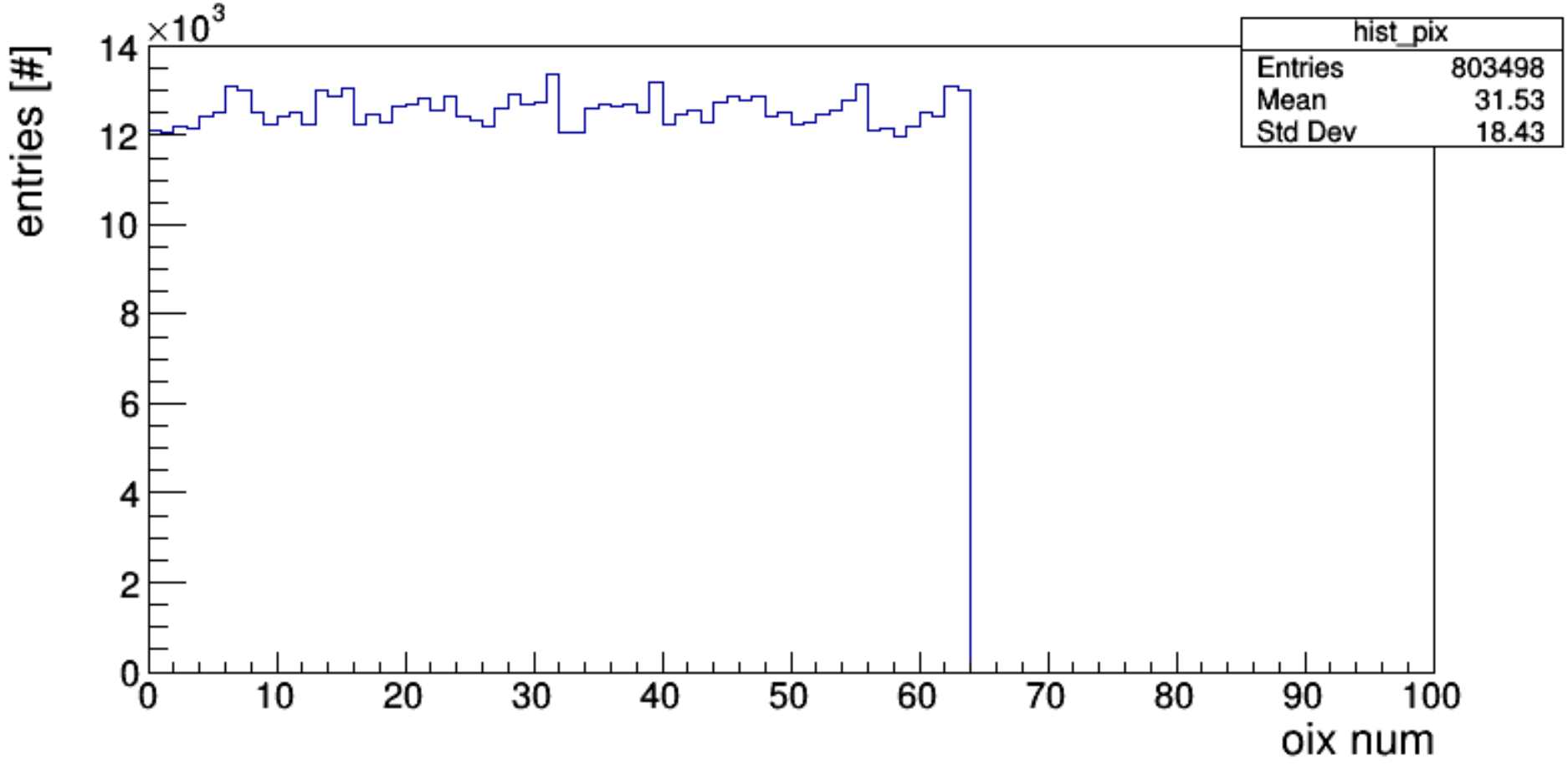

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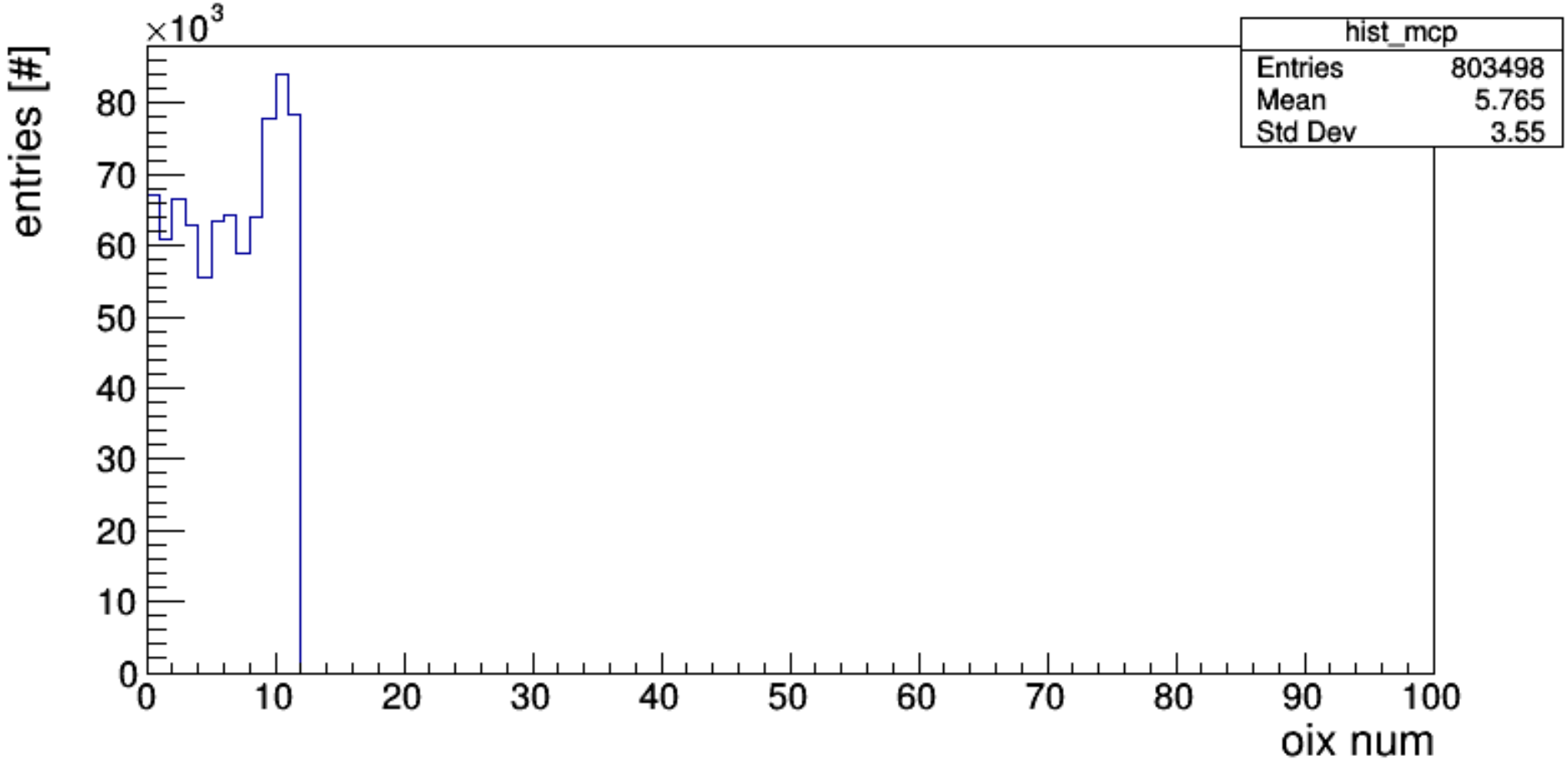

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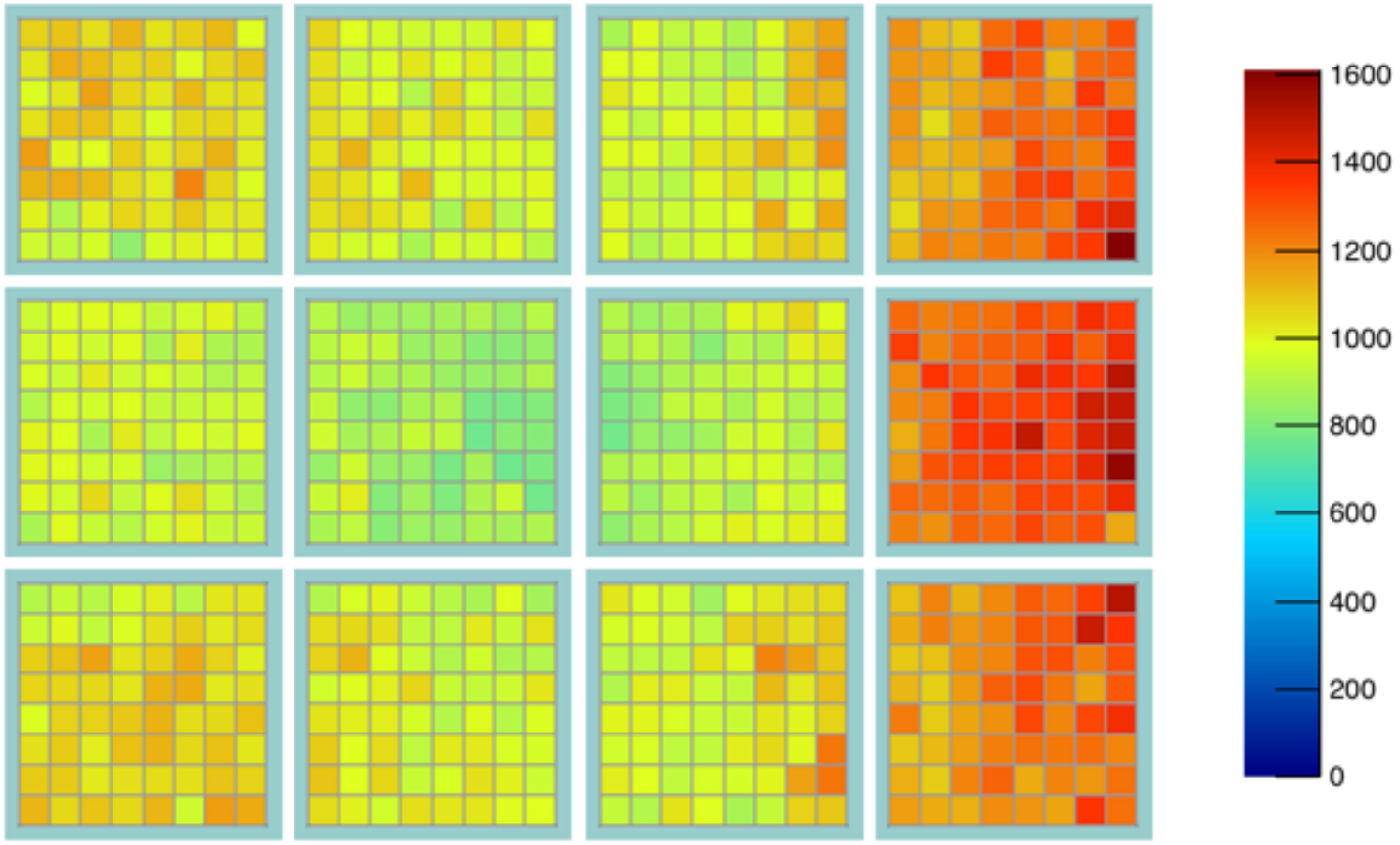

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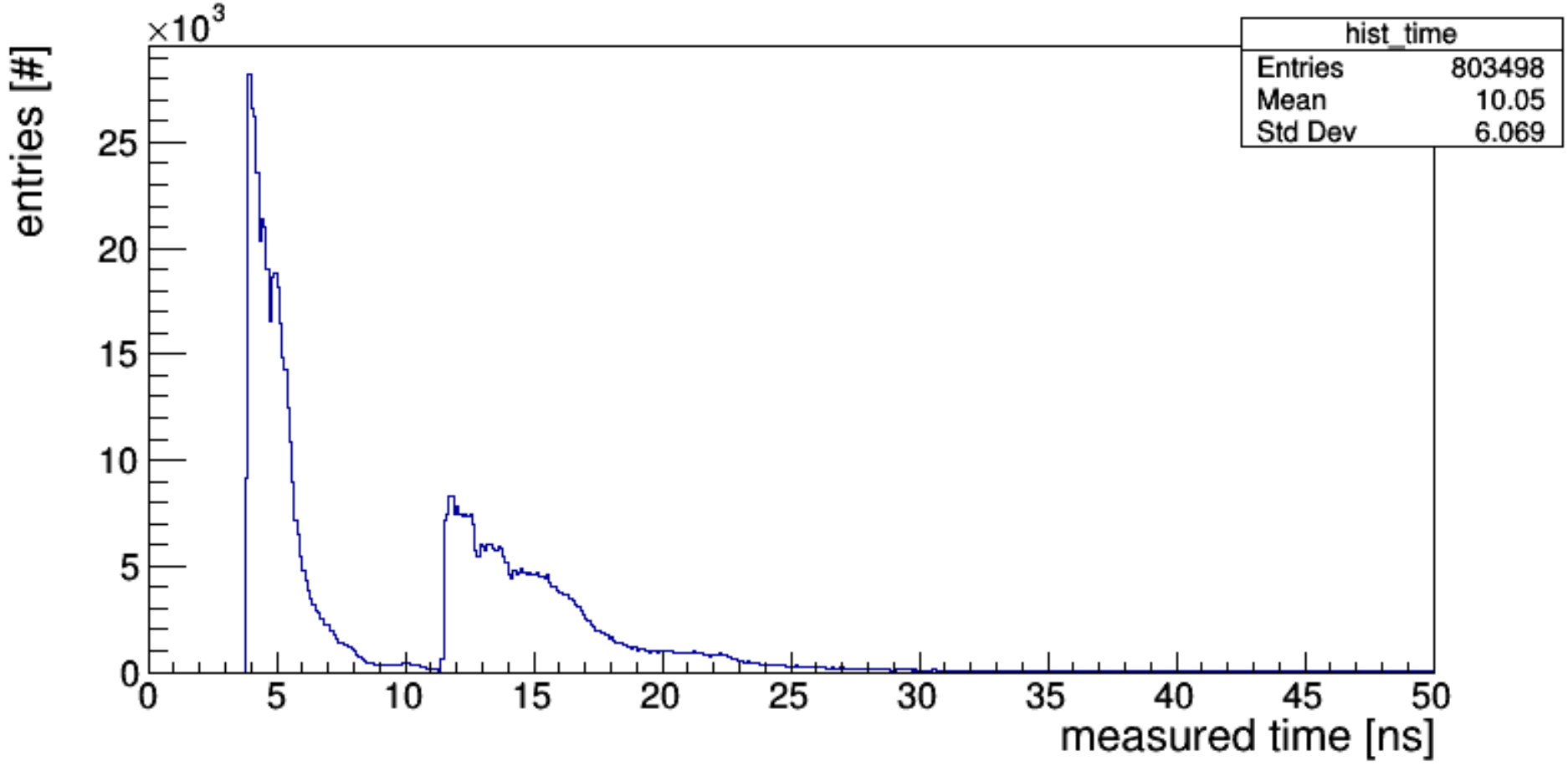


Testbeam 2017 Error Calculations

Testbeam 2017 Error Calculations bar – 3 layer spherical lens Geo. Reco

Error t and c cuts :

4 to 6 sigma of the true path inside prism

Error fit range :

0.05 to 0.07 rad around the MaximumBin of the true path inside prism

Error statistics:

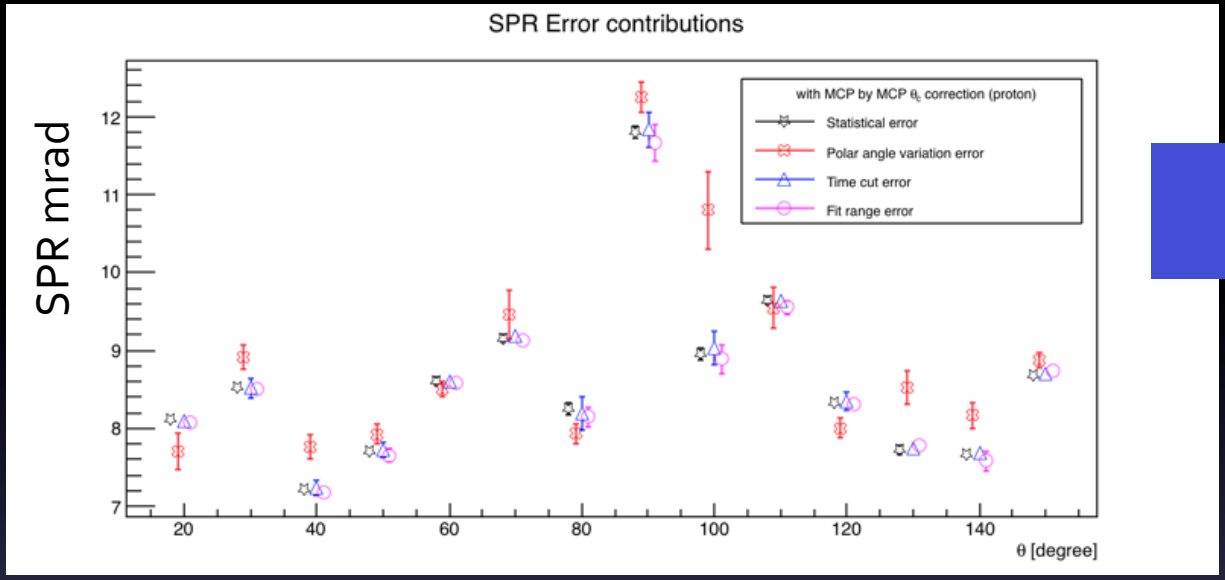
100 sample

Error Polar angle :

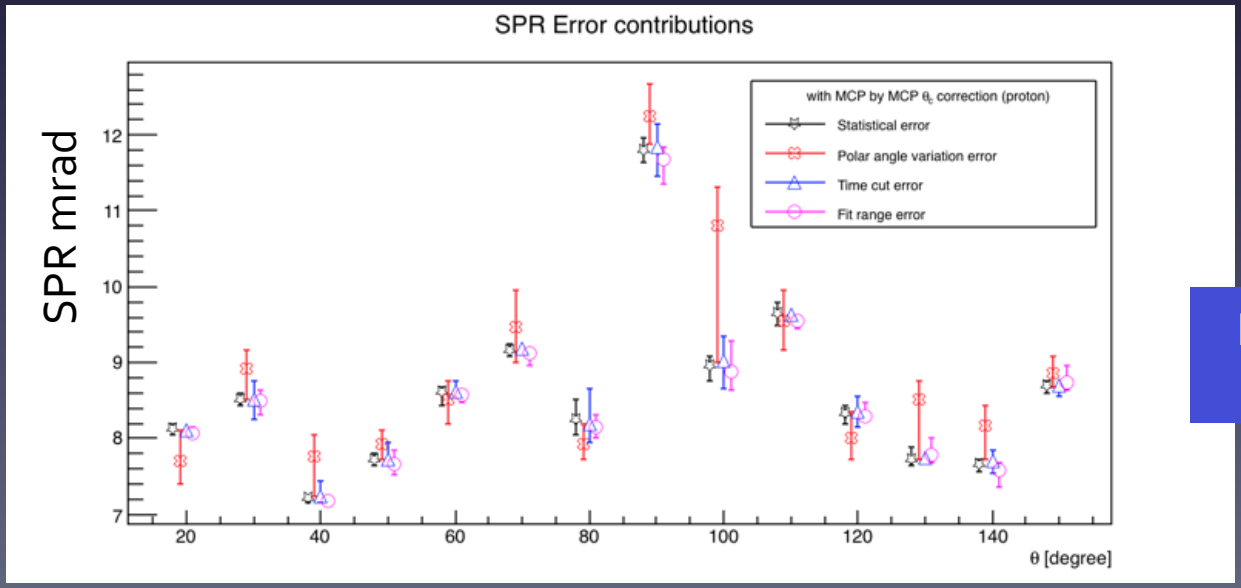
+/- 0.1 deg variation in polar angle

Error binning: (on going)

SPR Errors Contributions



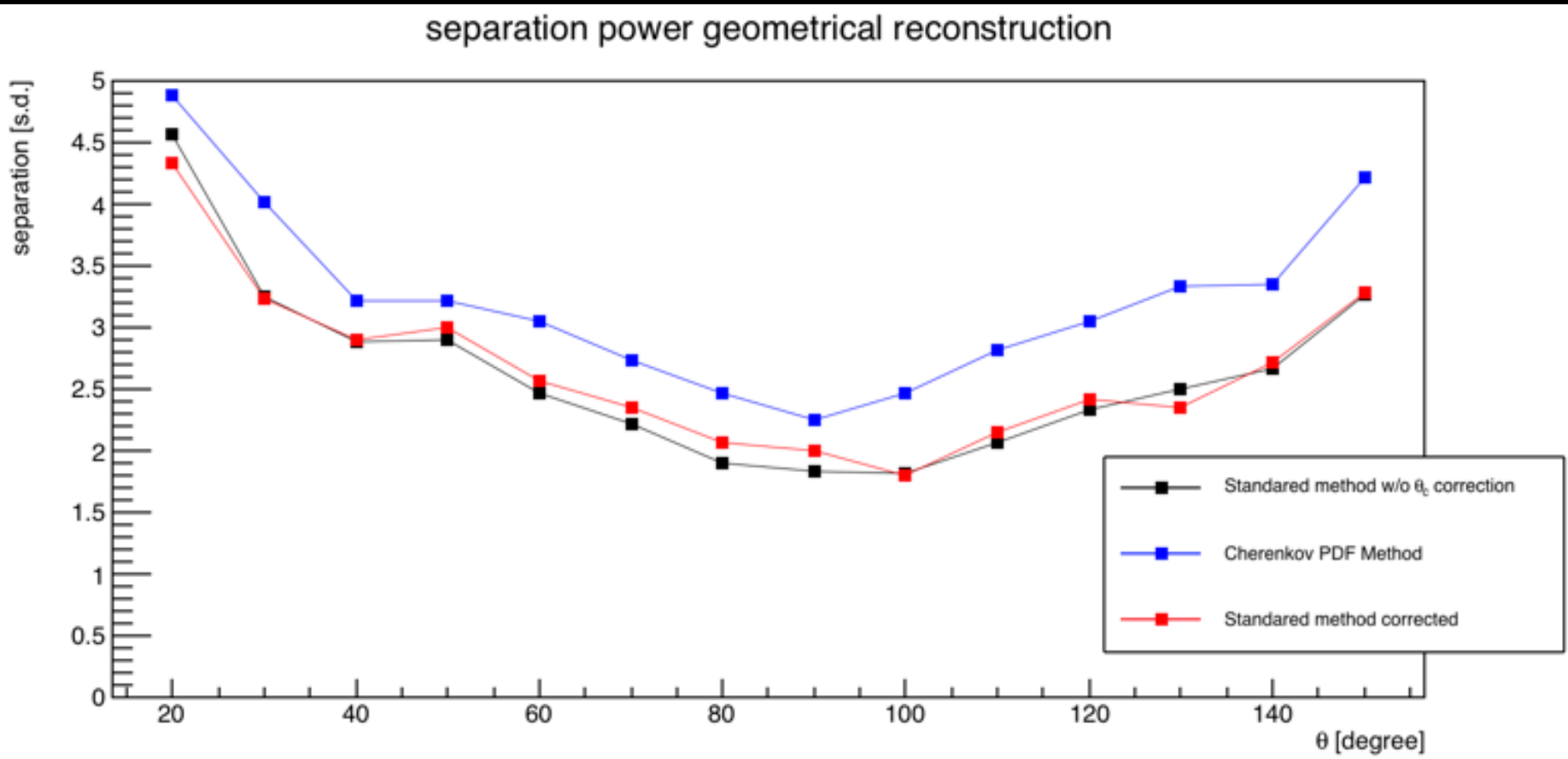
RMS of the distribution



Range of the distribution

Separation power

Sim



Separation power

Data