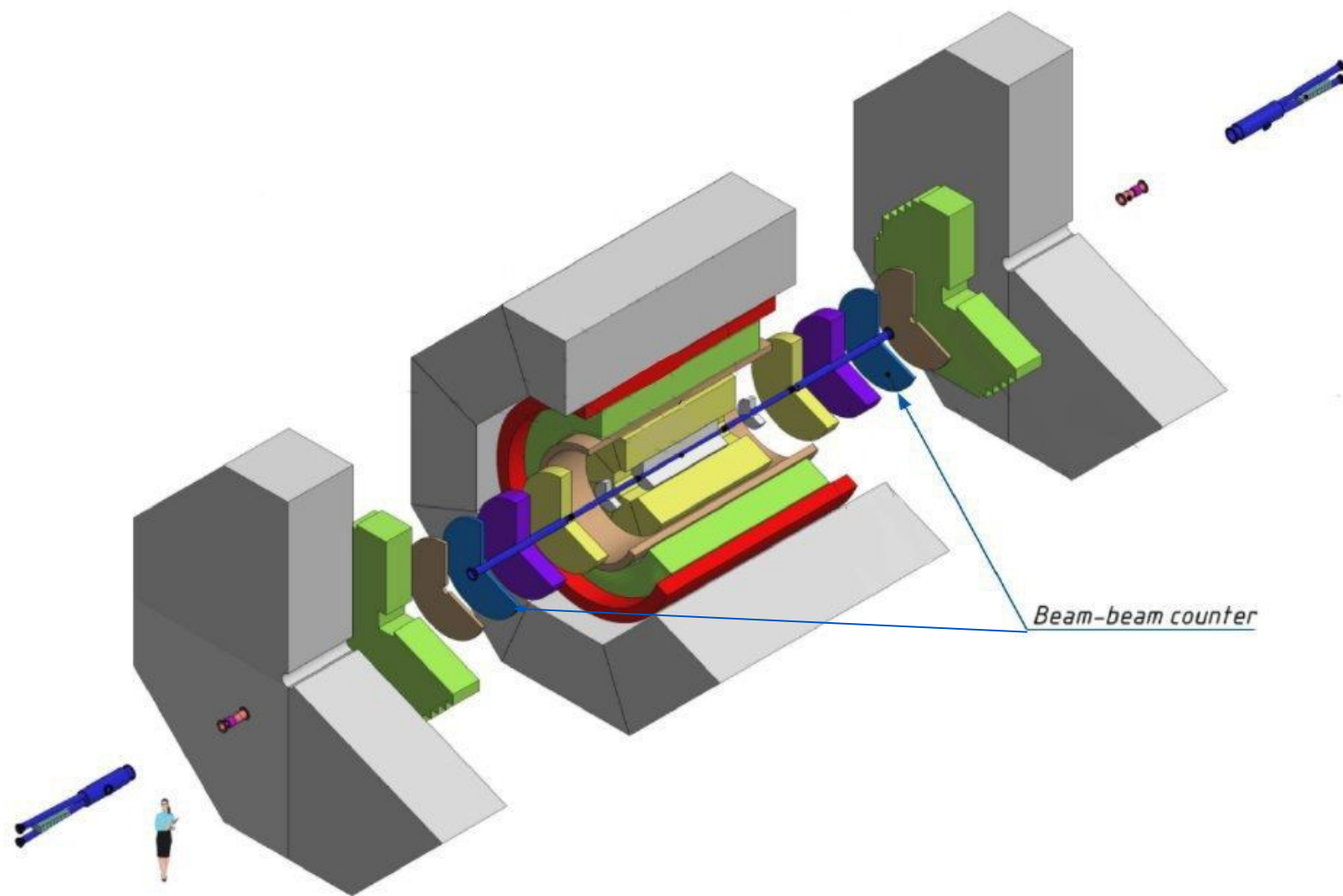


A refined Geant4 model of the BBC SPD experiment detector

Prepared by Egor Zavidov

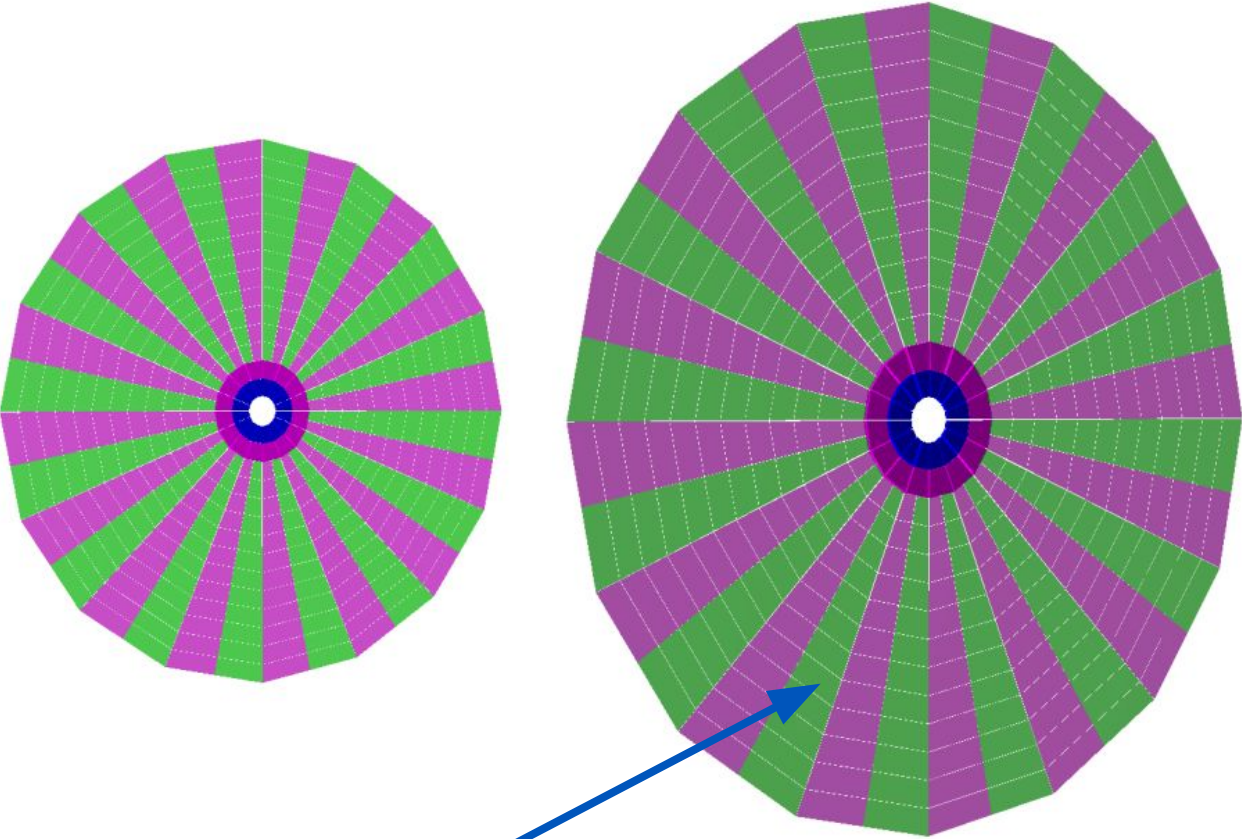


The SPD experiment and the BBC detector

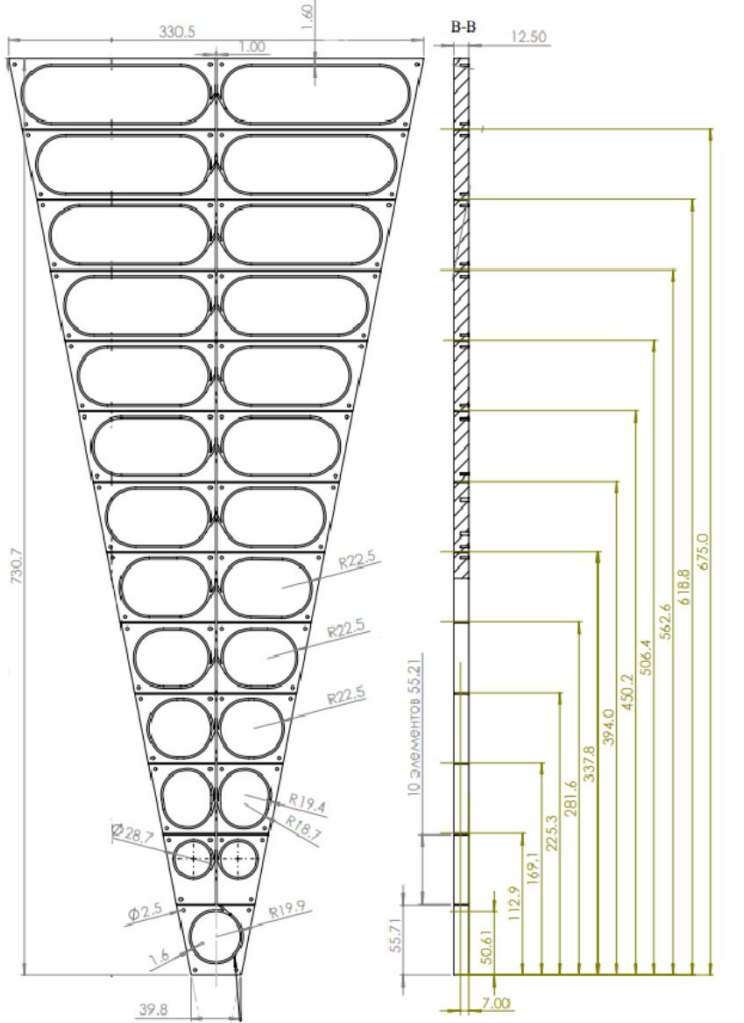


BBC Design and its Model

Existing Model

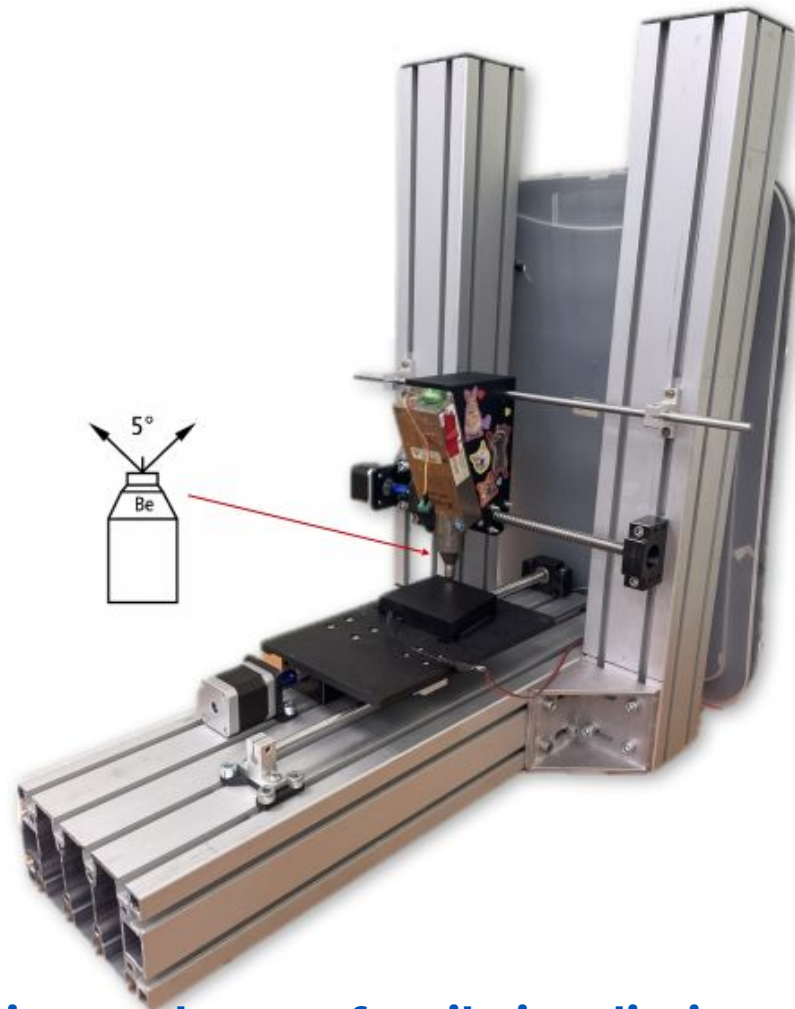


No grooves for wavelength-shifting fiber



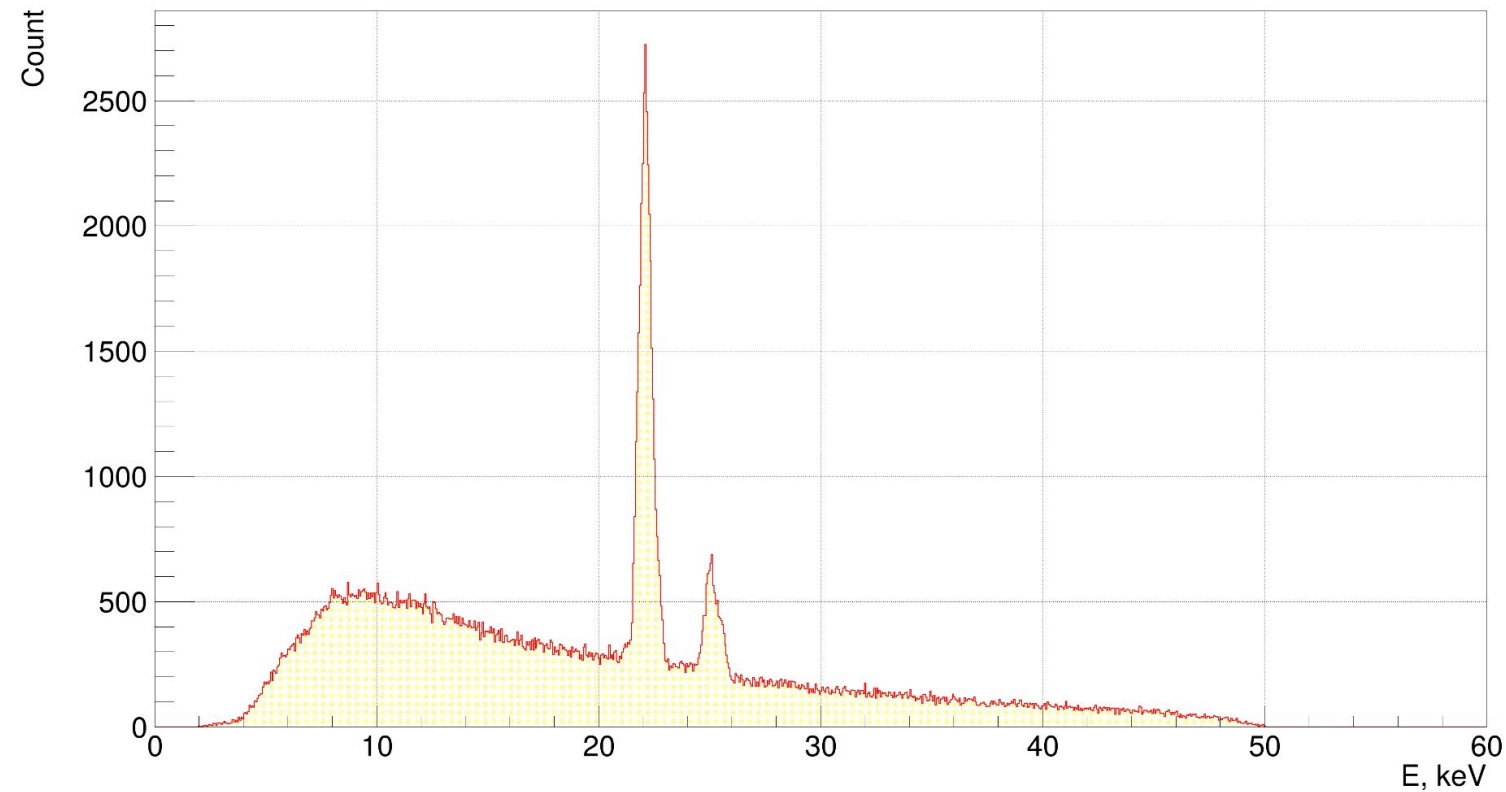
Sector drawing

Model and Experiment Comparison: Experimental Setup Configuration



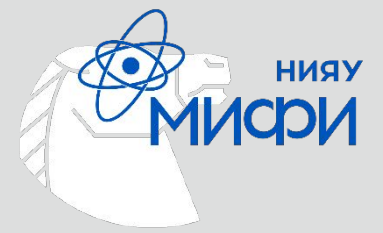
Experimental setup for tile irradiation with X-rays

Mini-X Silver (Ag) X-Ray Tube Output Spectrum

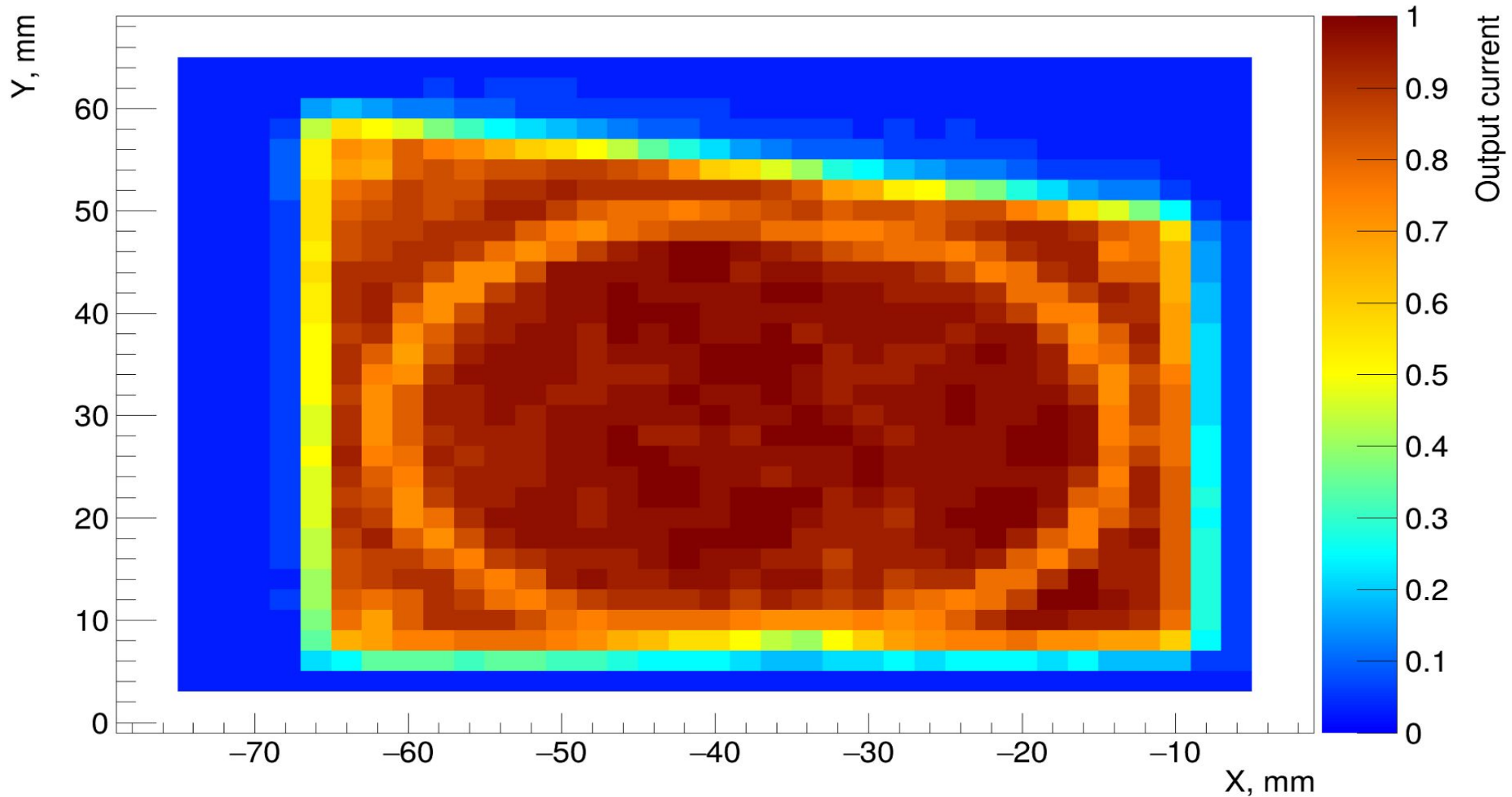


Digitized tube spectrum

Experimental data



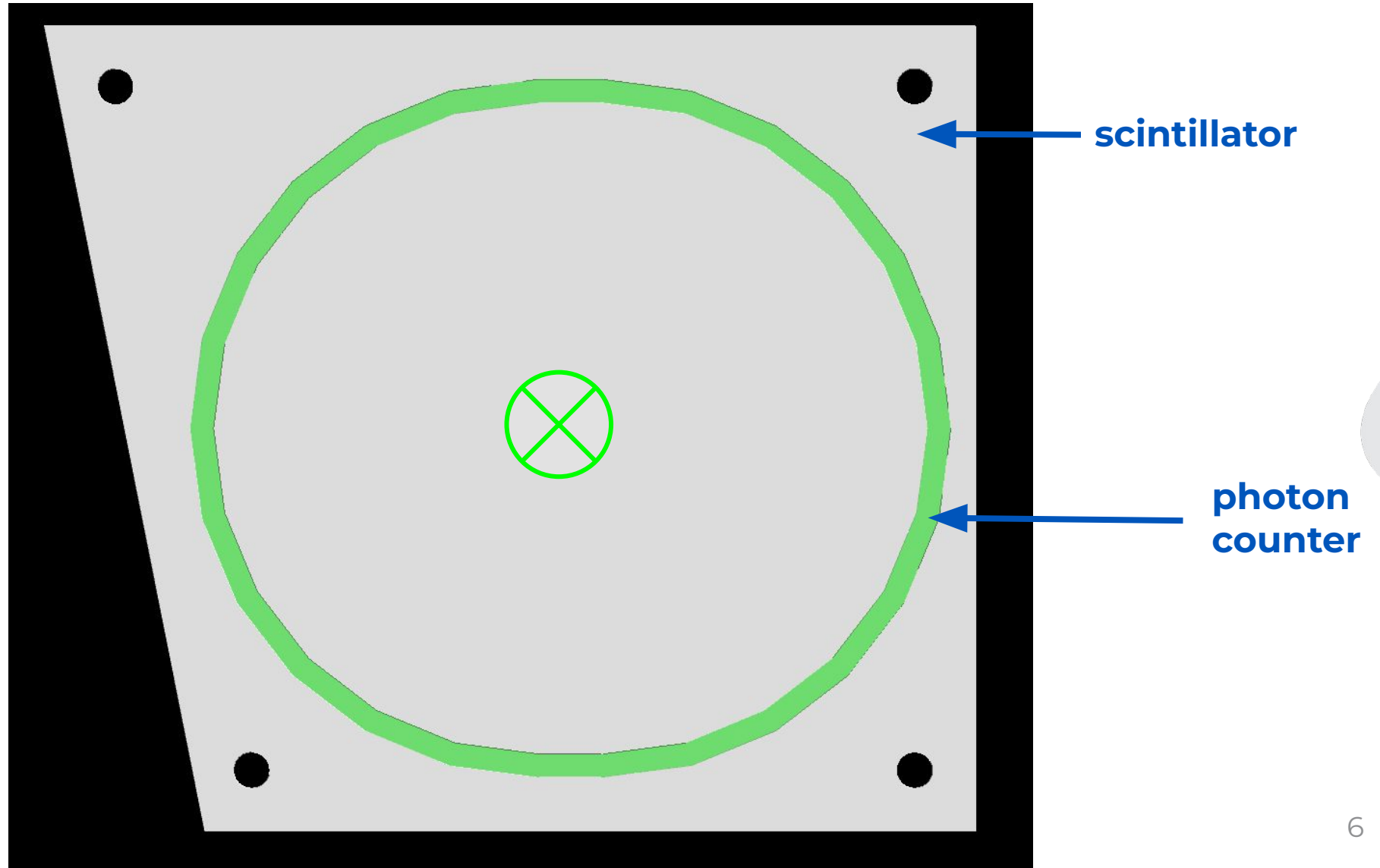
Normalized output current depending on hit position



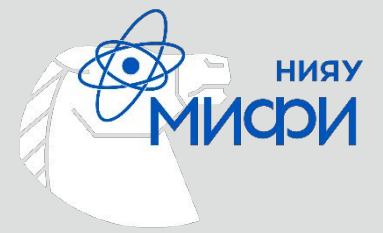
Model and Experiment Comparison: Model Configuration



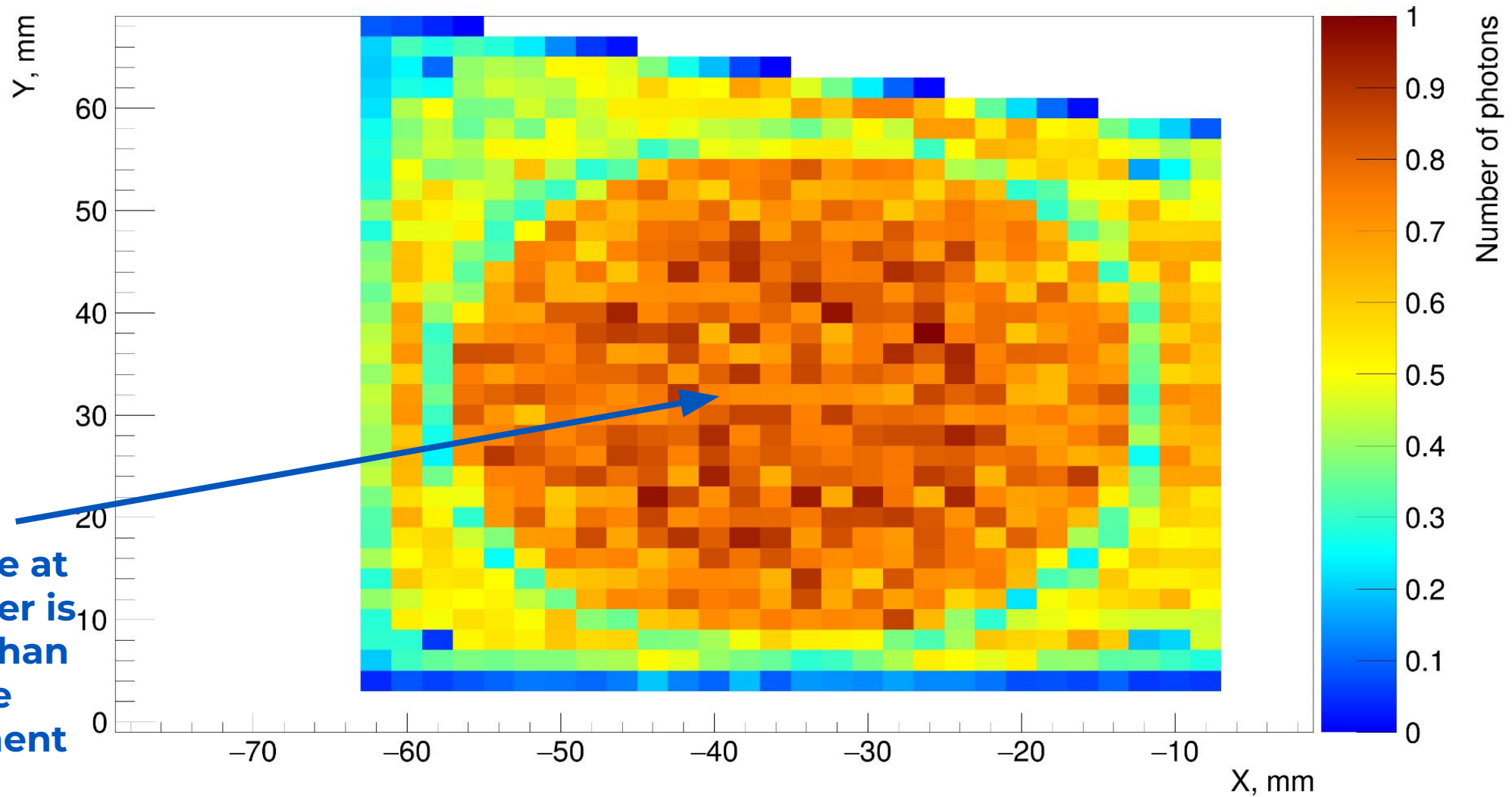
 - direction of gamma quantum momentum



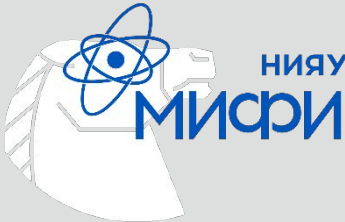
Model data



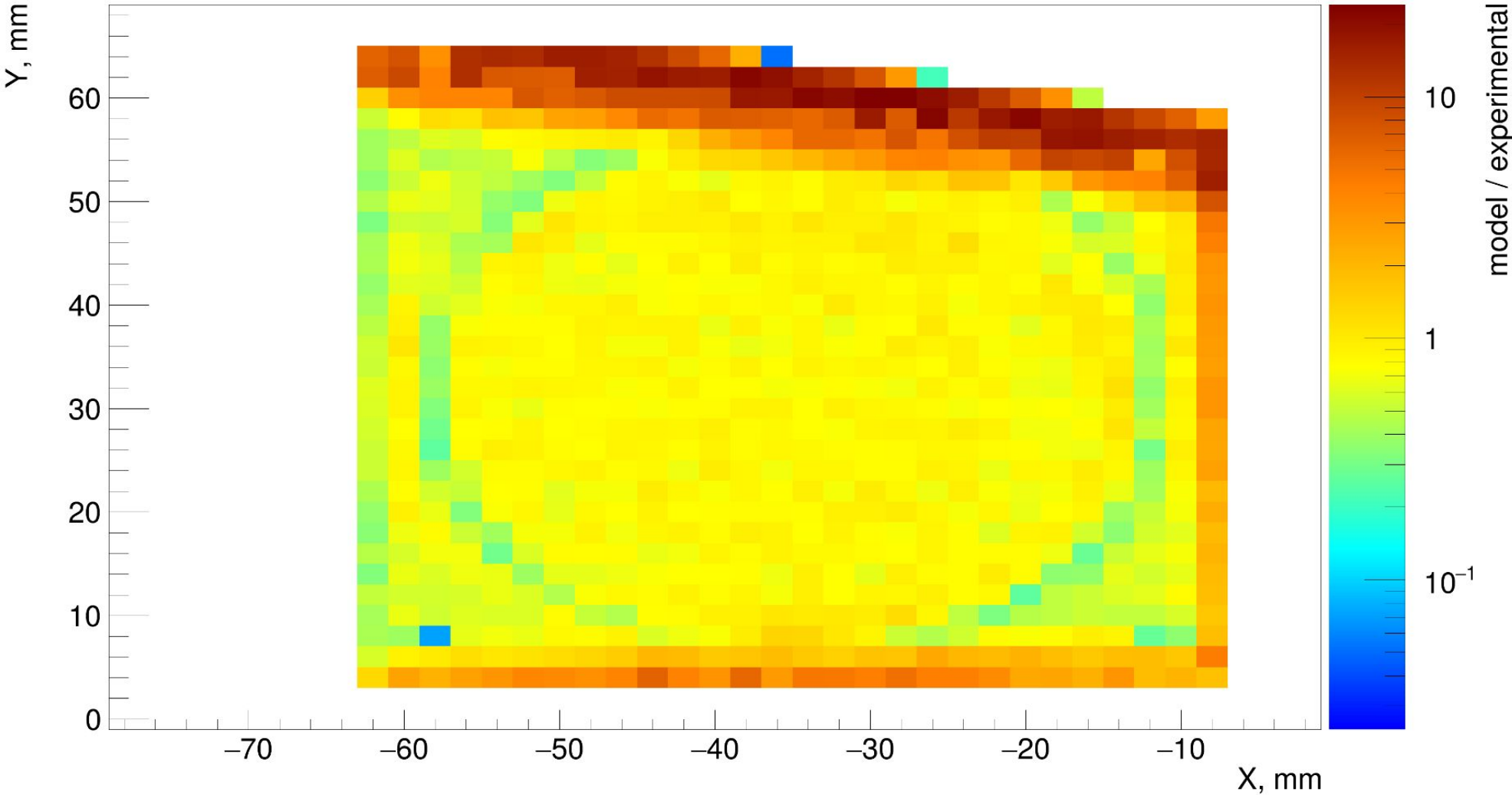
Photon numbers in fiber depending on hit position



Histogram ratio

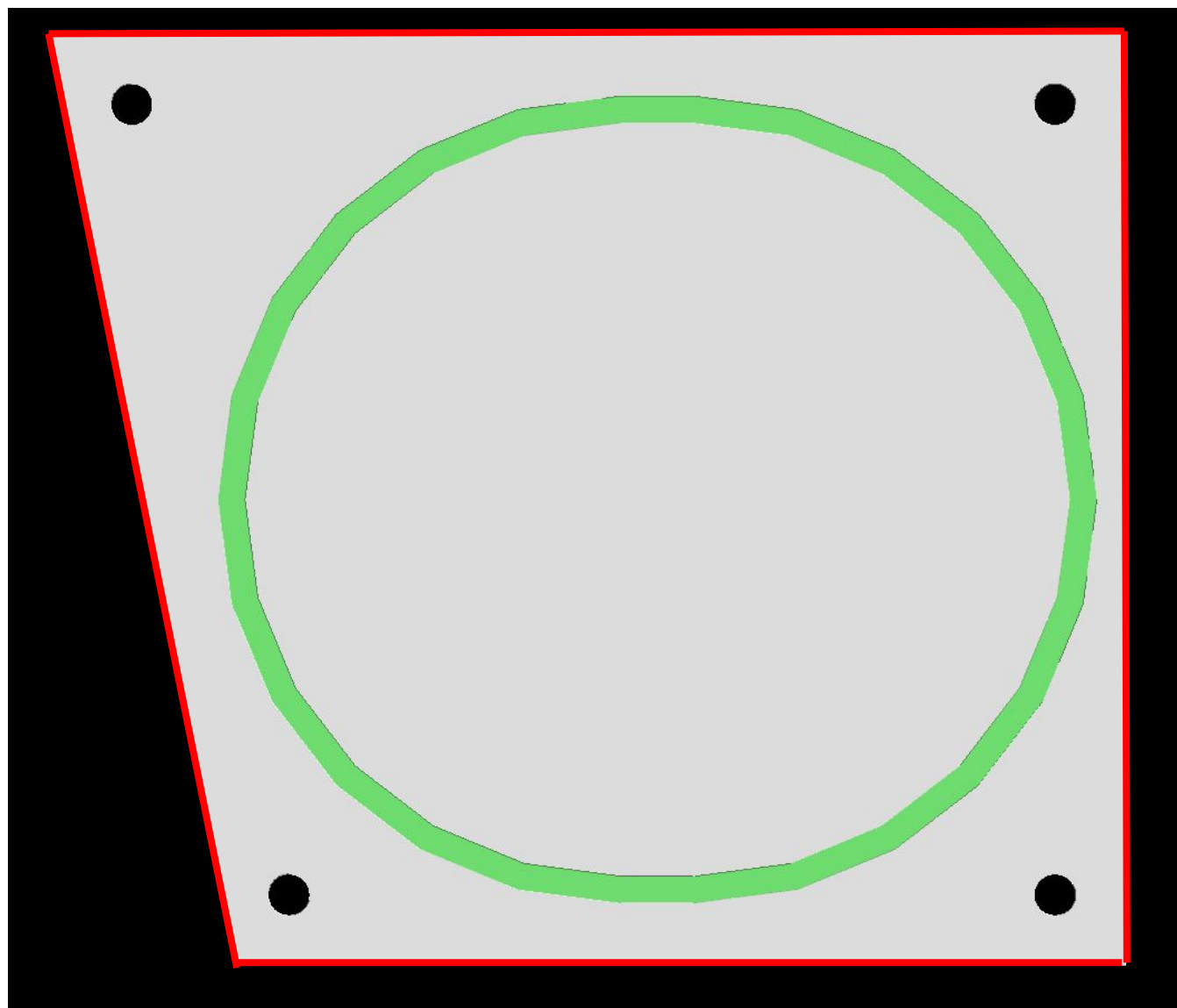


model / experimental

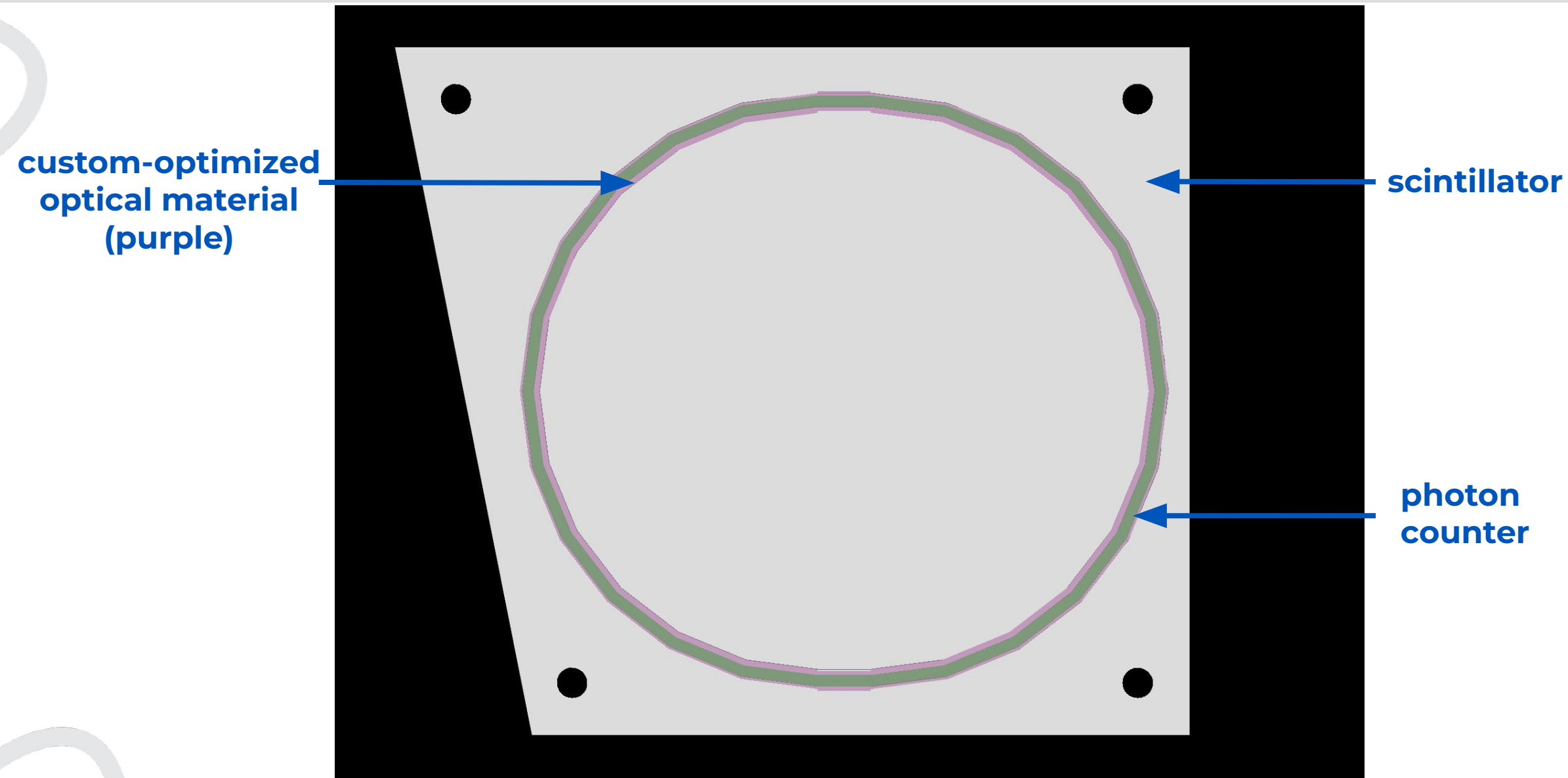


New model

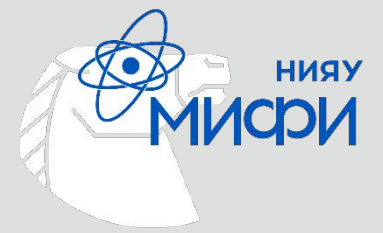
- total reflection
- total transmission



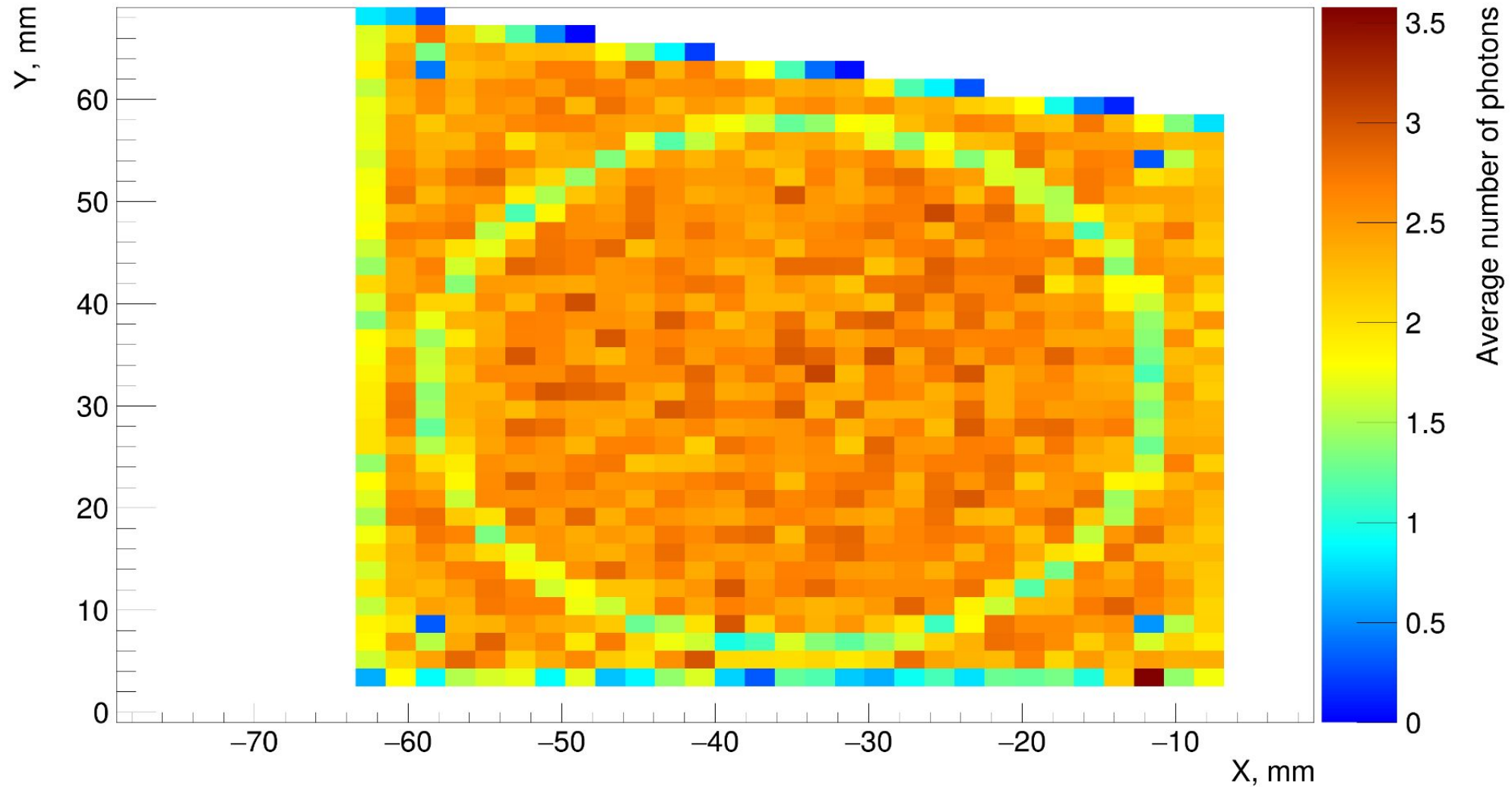
Geant4 realization



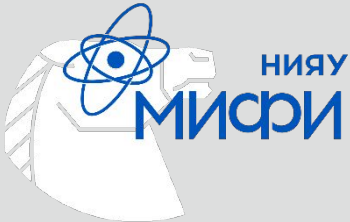
New model data



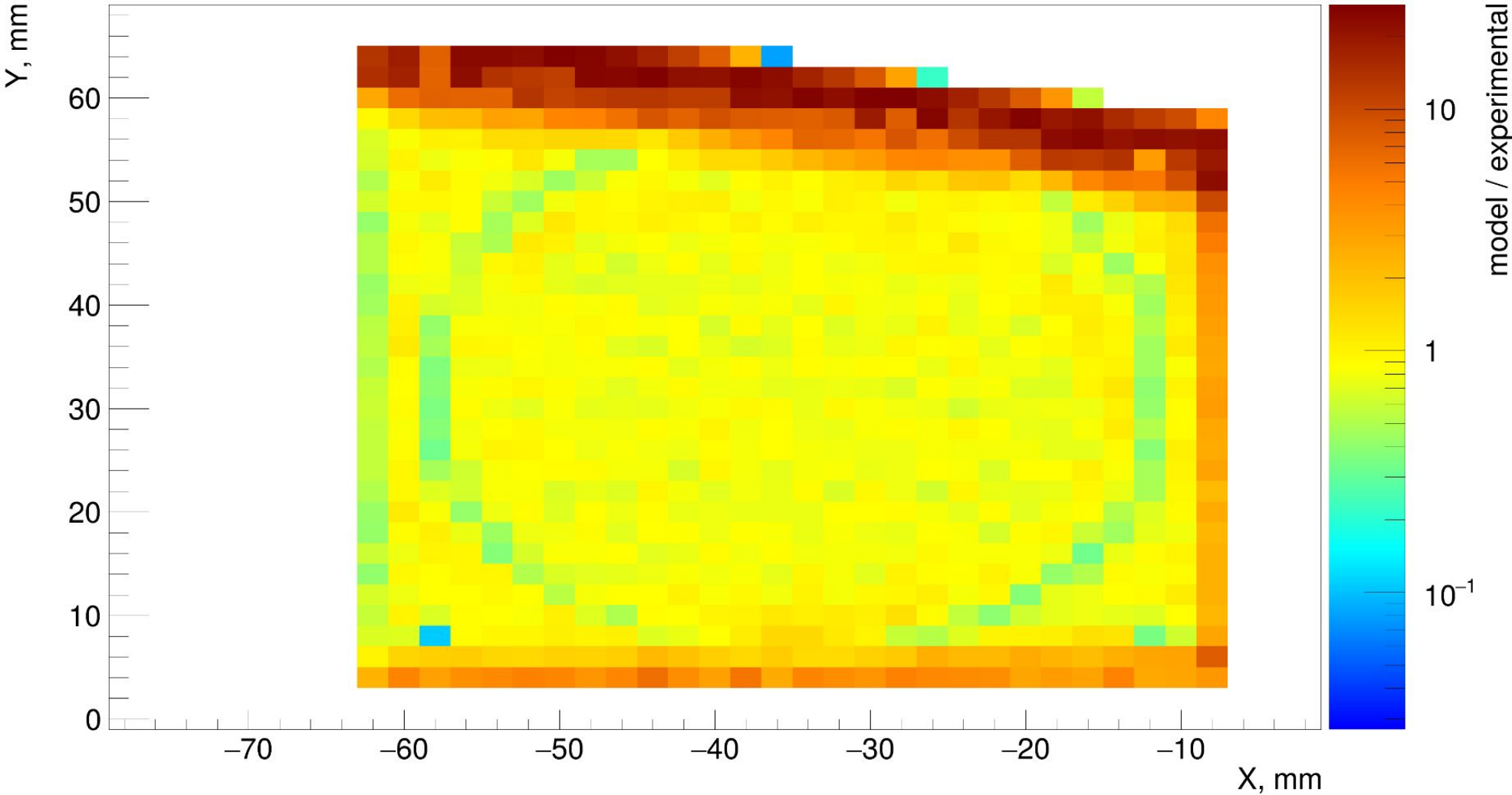
Average number of photons in fiber depending on hit position



Histogram ratio

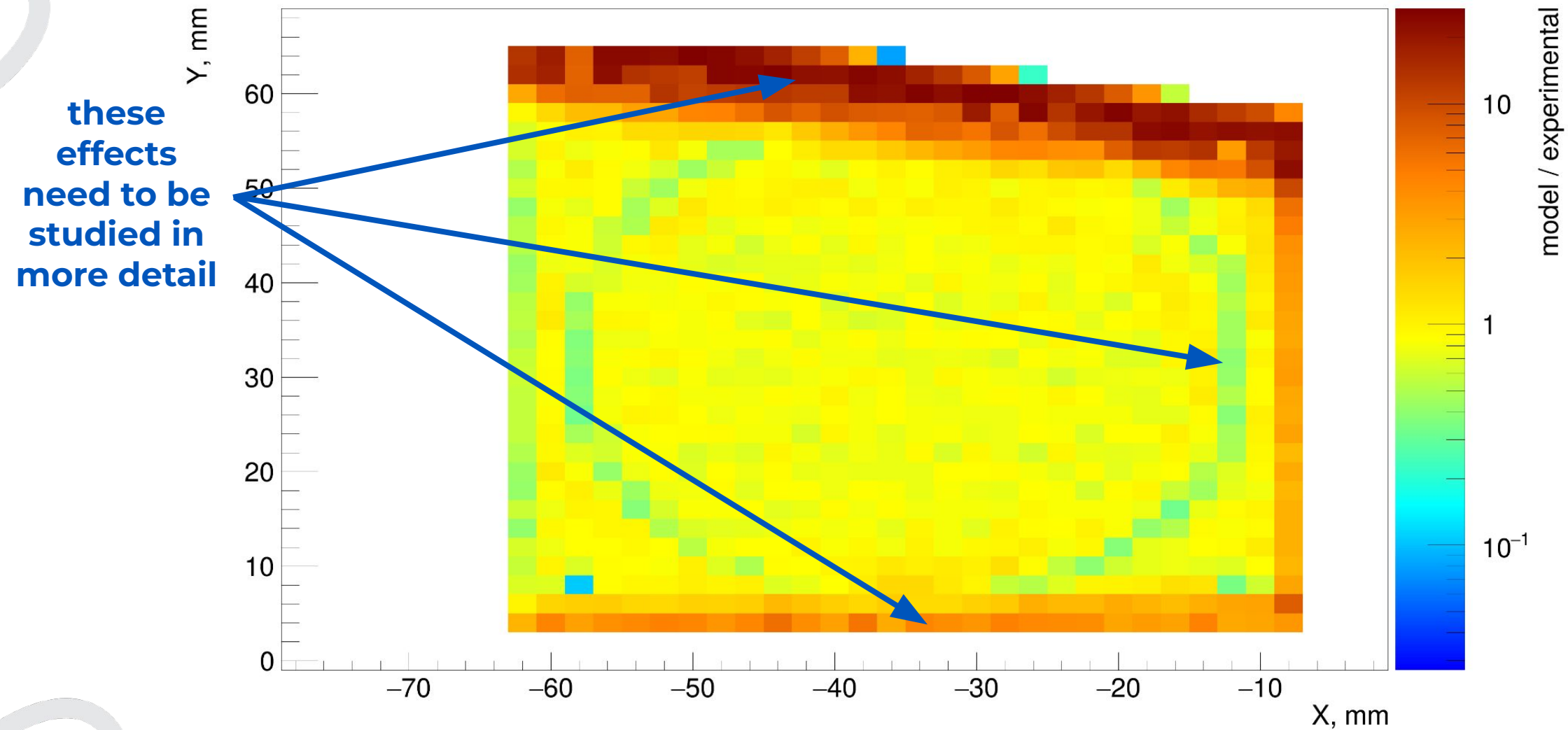


model / experimental

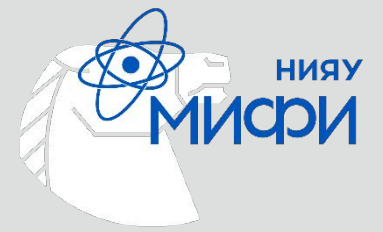


Histogram ratio

model / experimental



Further goals



1. **Model validation on other experimental data**
2. **Parameterization of the optical fiber path**
3. **Threshold tuning**



Thank you for your attention!

24.03.2026