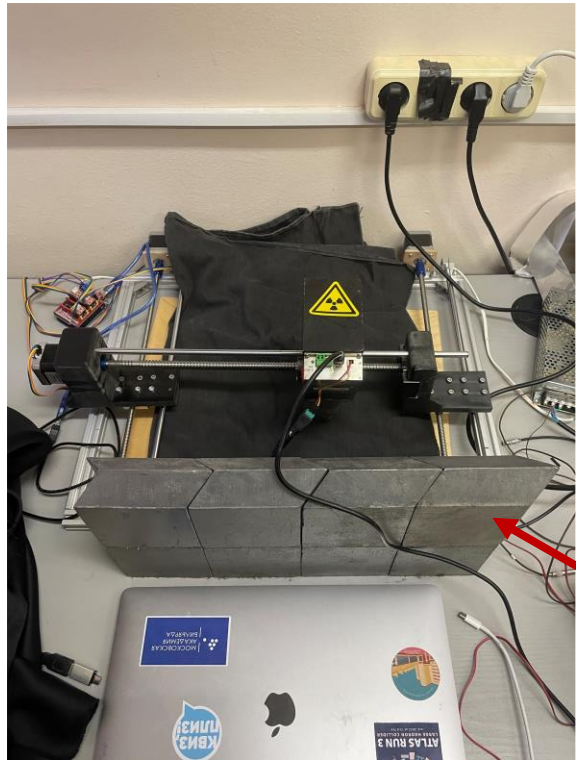


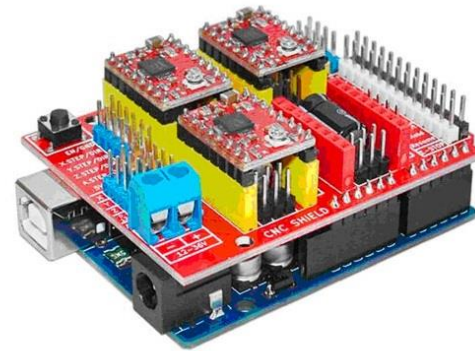
X-Ray scanner development status

Zakharov A., Durov A.

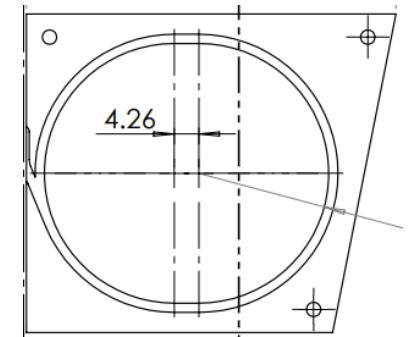
As you could probably remember, ...



Mini-X X-ray tube



Arduino with CNC shield and drivers



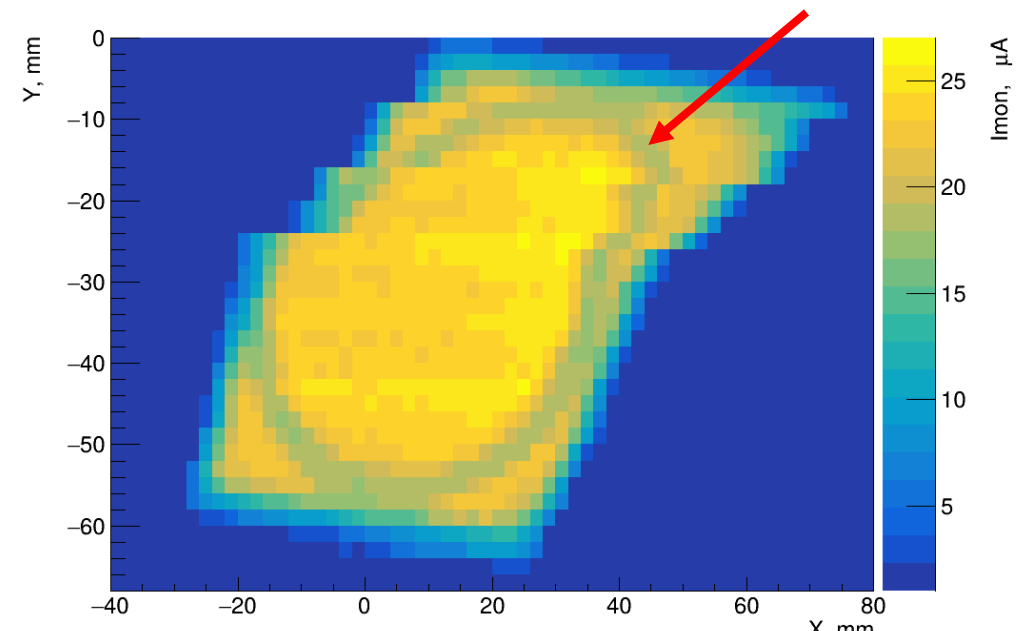
Row 3 tile with SG BCF92

WLS fiber

Pb bricks for radiation shielding

Coordinate table with X-ray tube:

- **AMPTEK Mini-X X-ray tube**
Ag target, 50 kV / 80 μ A, 2 mm collimator (5° X-ray cone) with \sim 2 cm from tile
- **NEMA 17 stepping motors**
Angular step 1.8°, 20 & 40 μ m resolution (X and Y axis correspondingly)
- **Arduino and CNC Shield**
Microcontroller board, enables movement automatization
- **CAEN DT5202**
A7585D power supply with 1 μ A resolution



Detector response VS. coordinate (preliminary)

The new mechanics



- Horizontal axis is perpendicular to the tube axis (precise);
- 3D-modeled table and stepping motor's fixation;
- Actually solved problems with overheating

The Setup

Old vs new design:

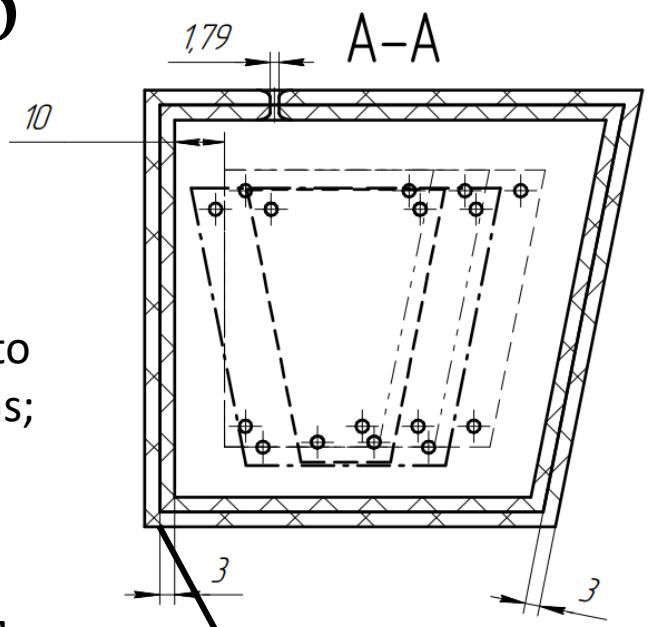
New design is closer to experiment conditions;

There is a way to use thermostabilizing technologies for SiPM;

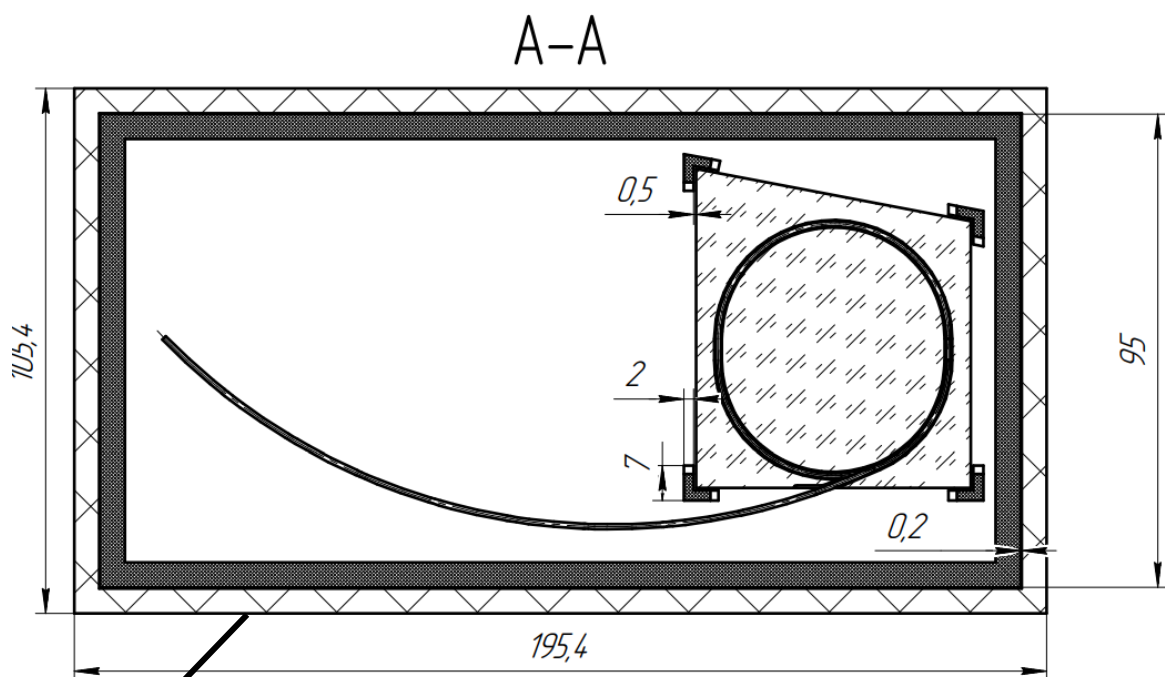
Absolutely inefficient in terms of mass production;

It is difficult to produce a single design for all tiles without potential breakage of WLS;

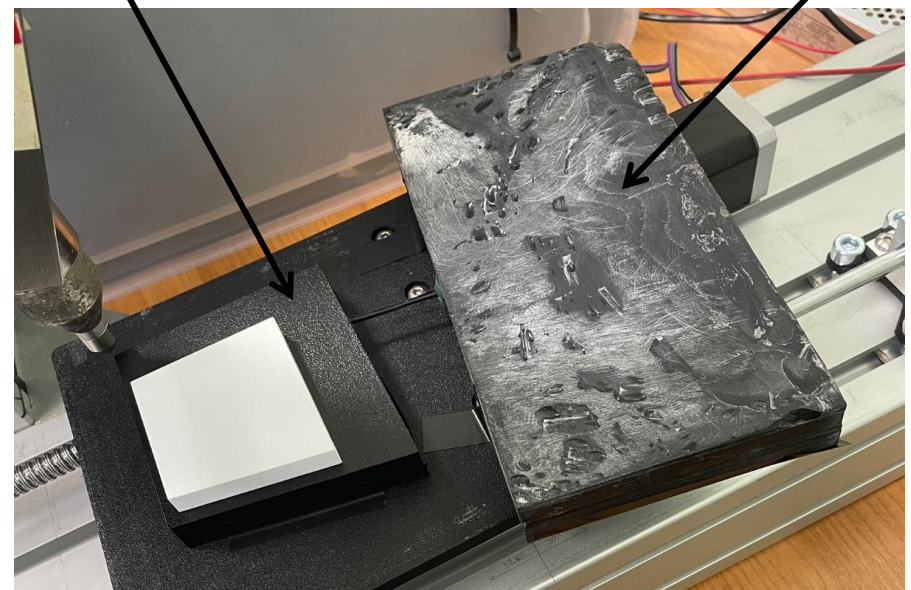
potentially zero repeatability.



Tile box design (updated)

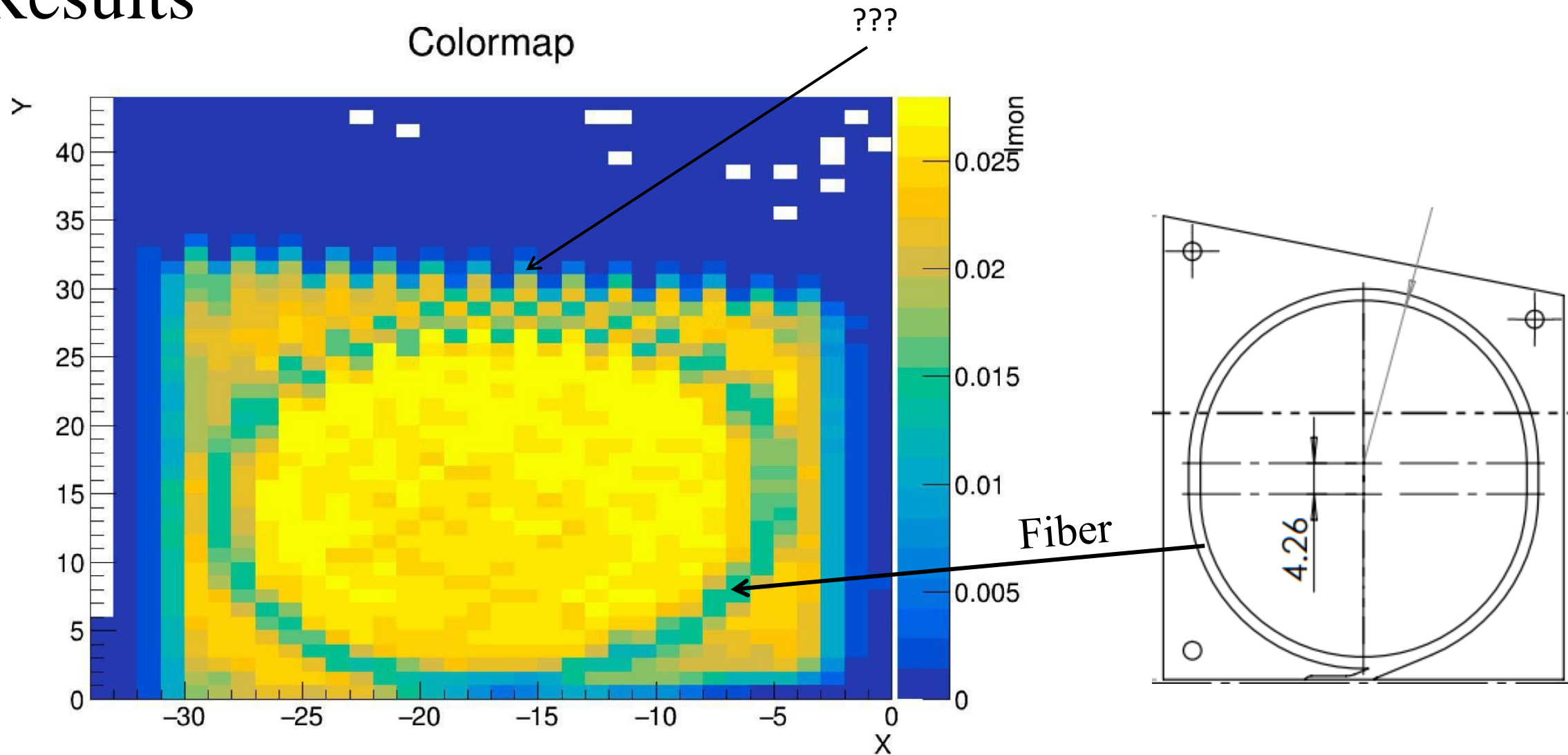


Tile box design (former)
During first tests used as SiPM black box



Fiber between two boxes is insulated via tape
Both boxes (including tile inside it) are fixed using tape

Results



The largest response is observed inside the region bounded by the fiber;
The outer region of the tile has a slightly suppressed response;
In the area where the fiber passes through, the response is strongly suppressed

THANK YOU FOR YOUR ATTENTION!