Validation of SSDs in Aachen


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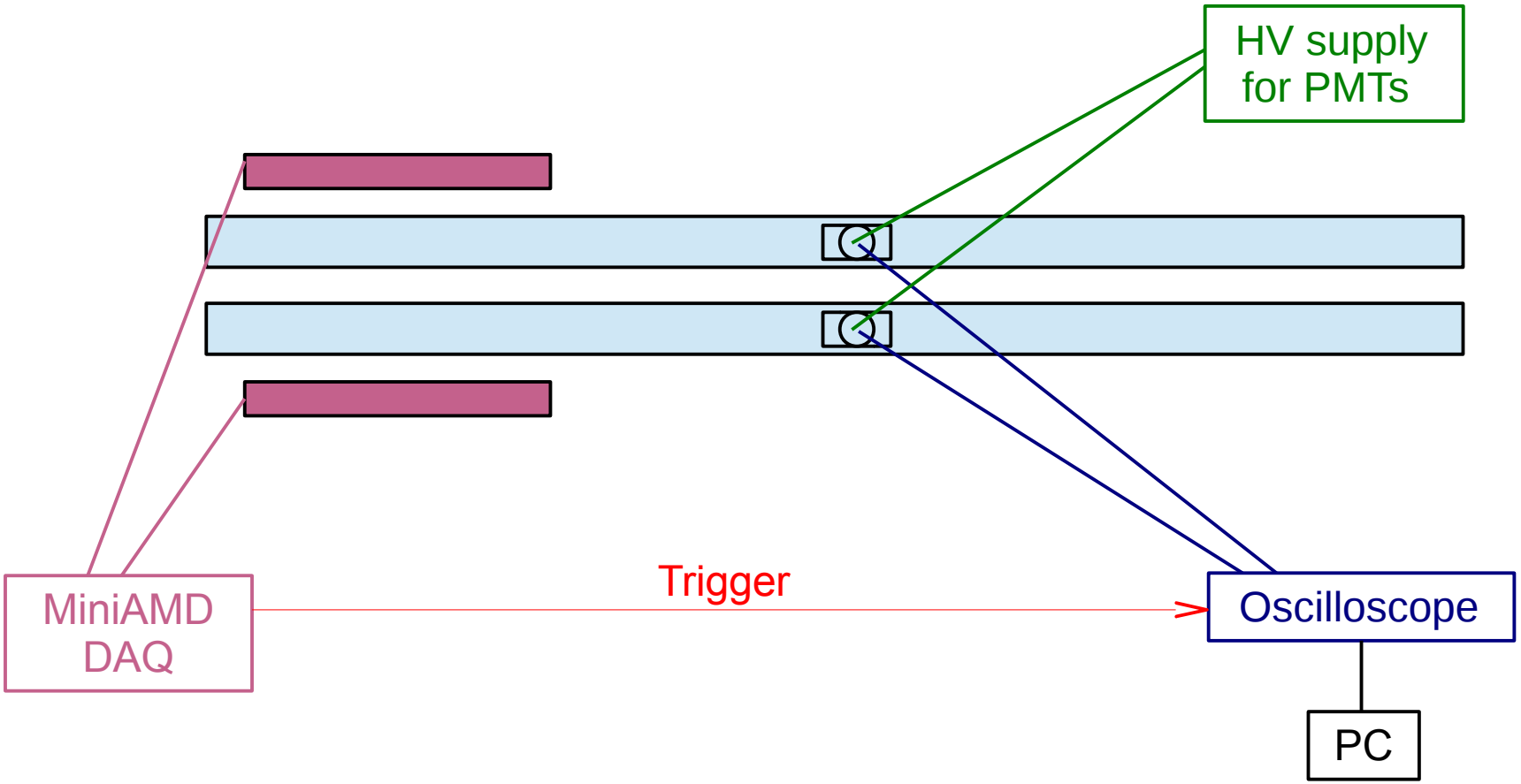
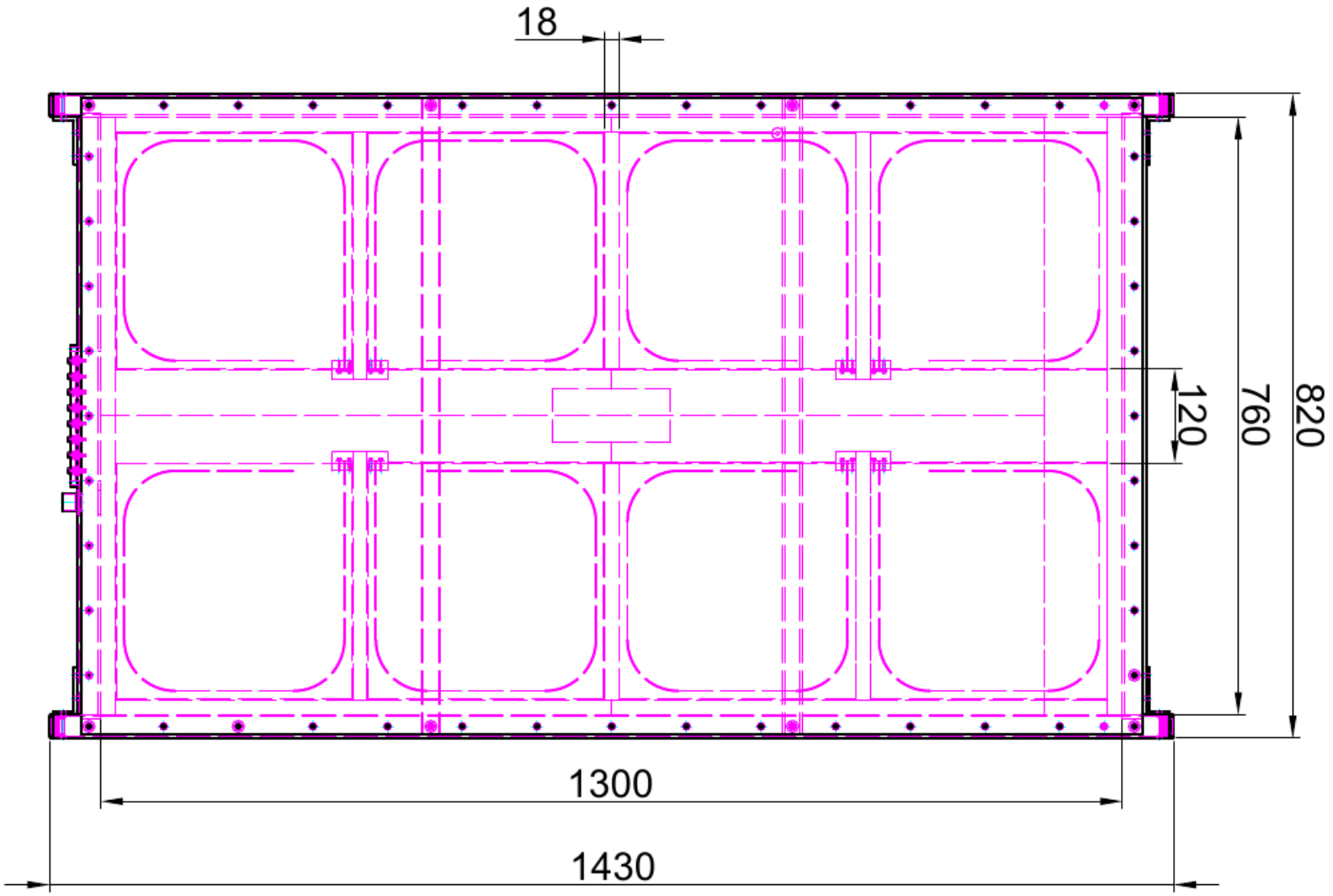
Idea

Two MiniAMD units – scintillator detectors

AMD stands for Aachen Muon Detector



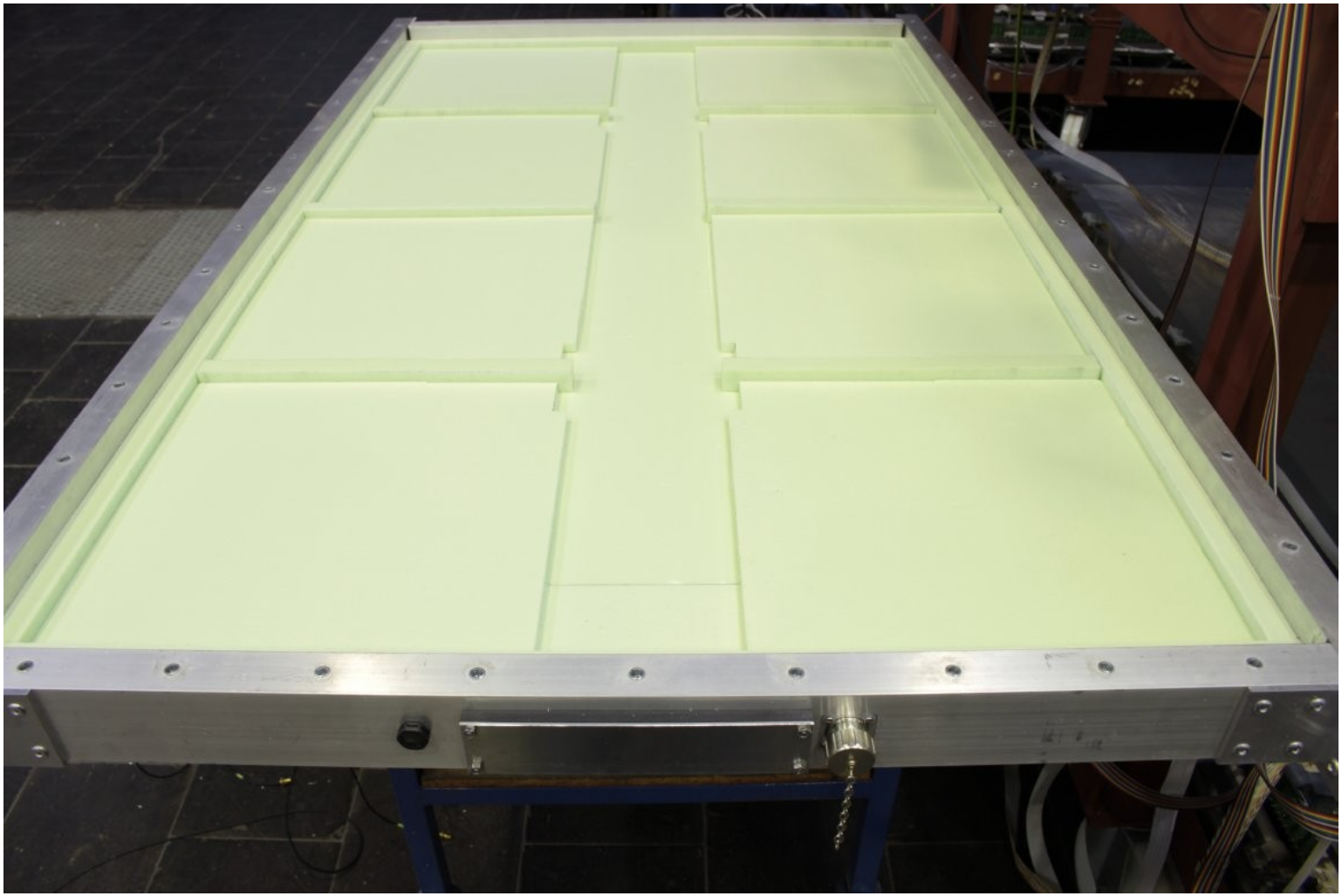
MiniAMD



Figures provided by C. Peters

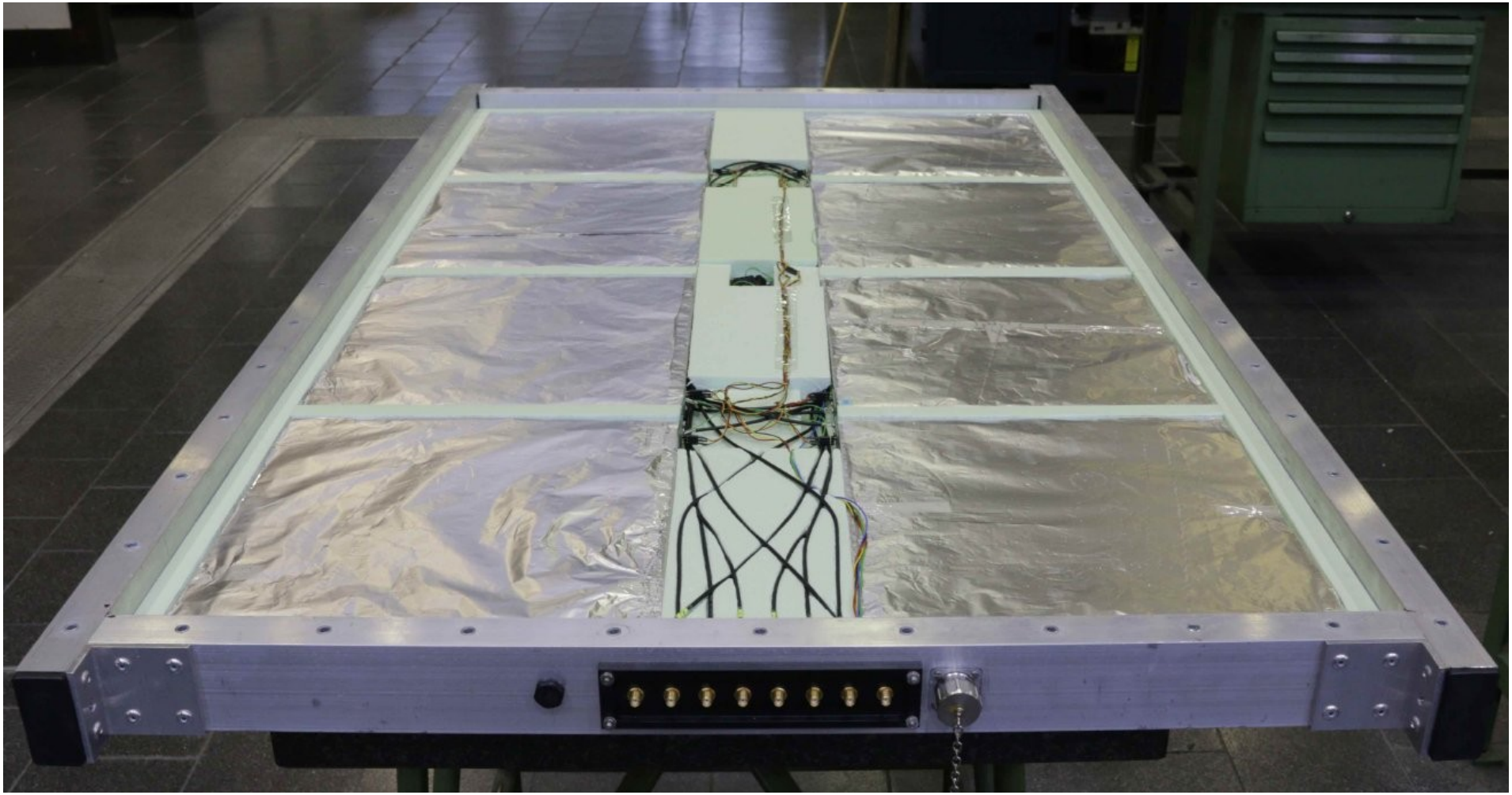
MiniAMD assembly

Styrodur material in an aluminium box



MiniAMD assembly

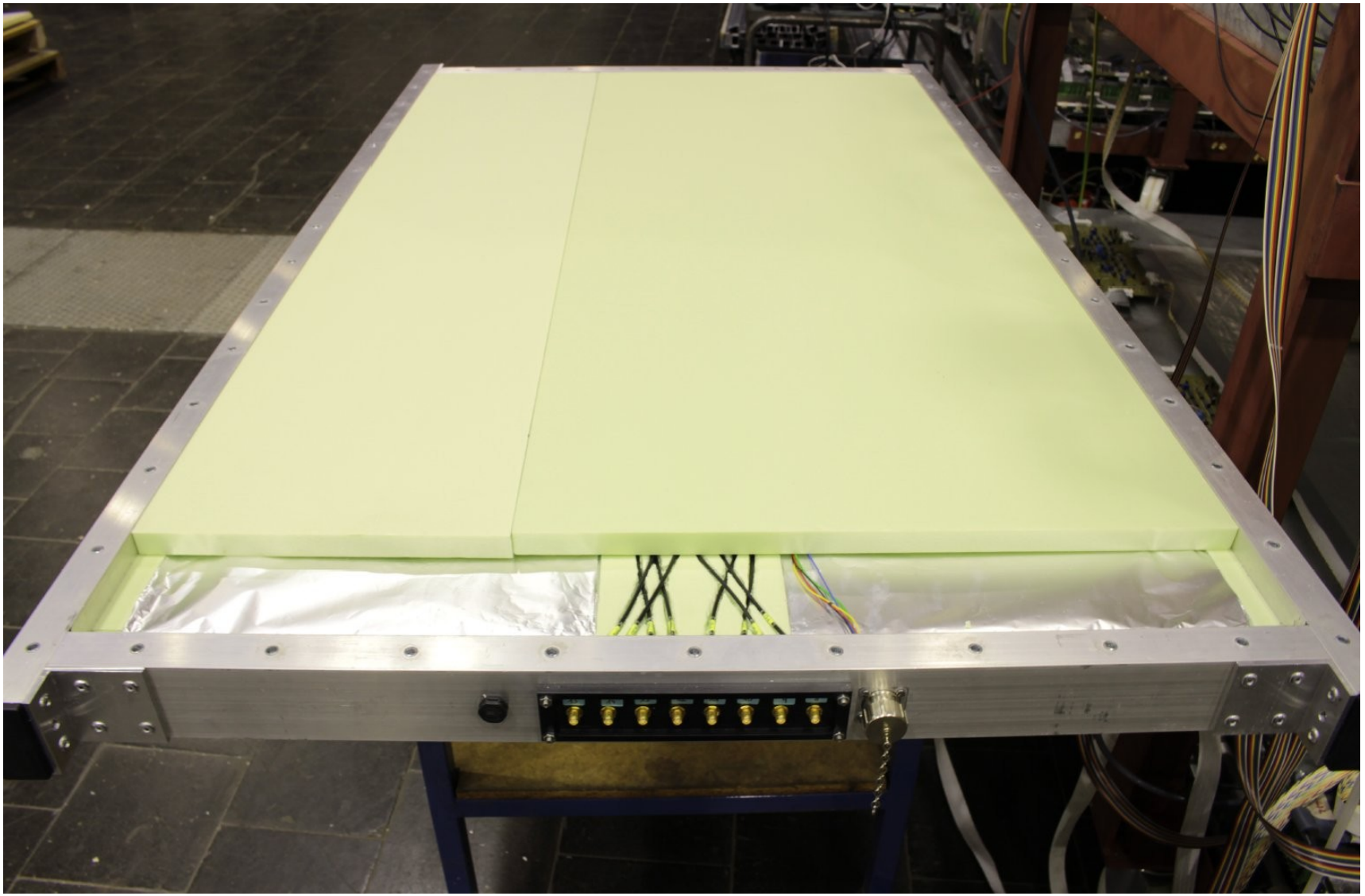
A matrix of 2 x 4 scintillator tiles wrapped in Tyvek and aluminium foils



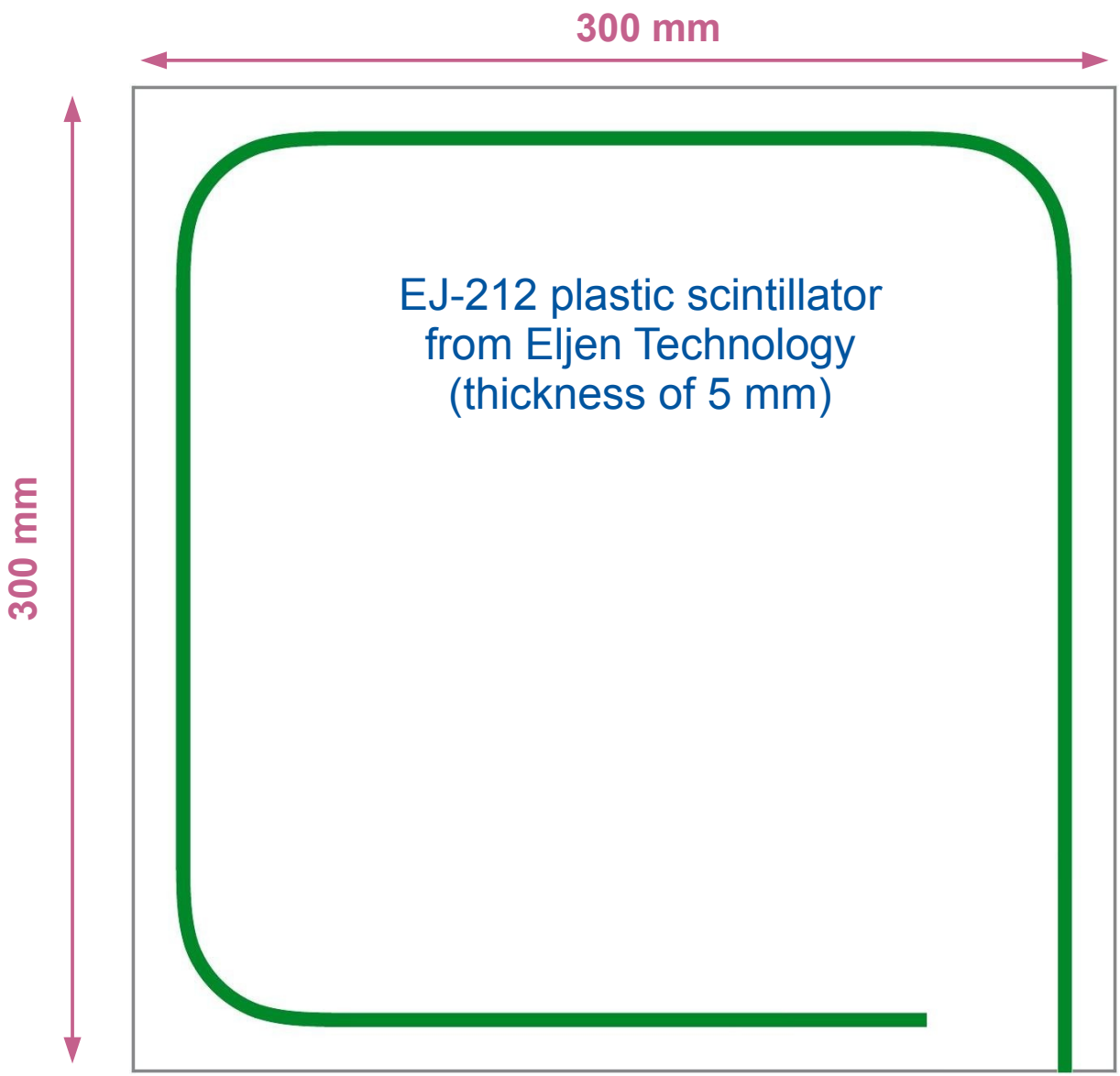
The fill factor is ca. 70%

MiniAMD assembly

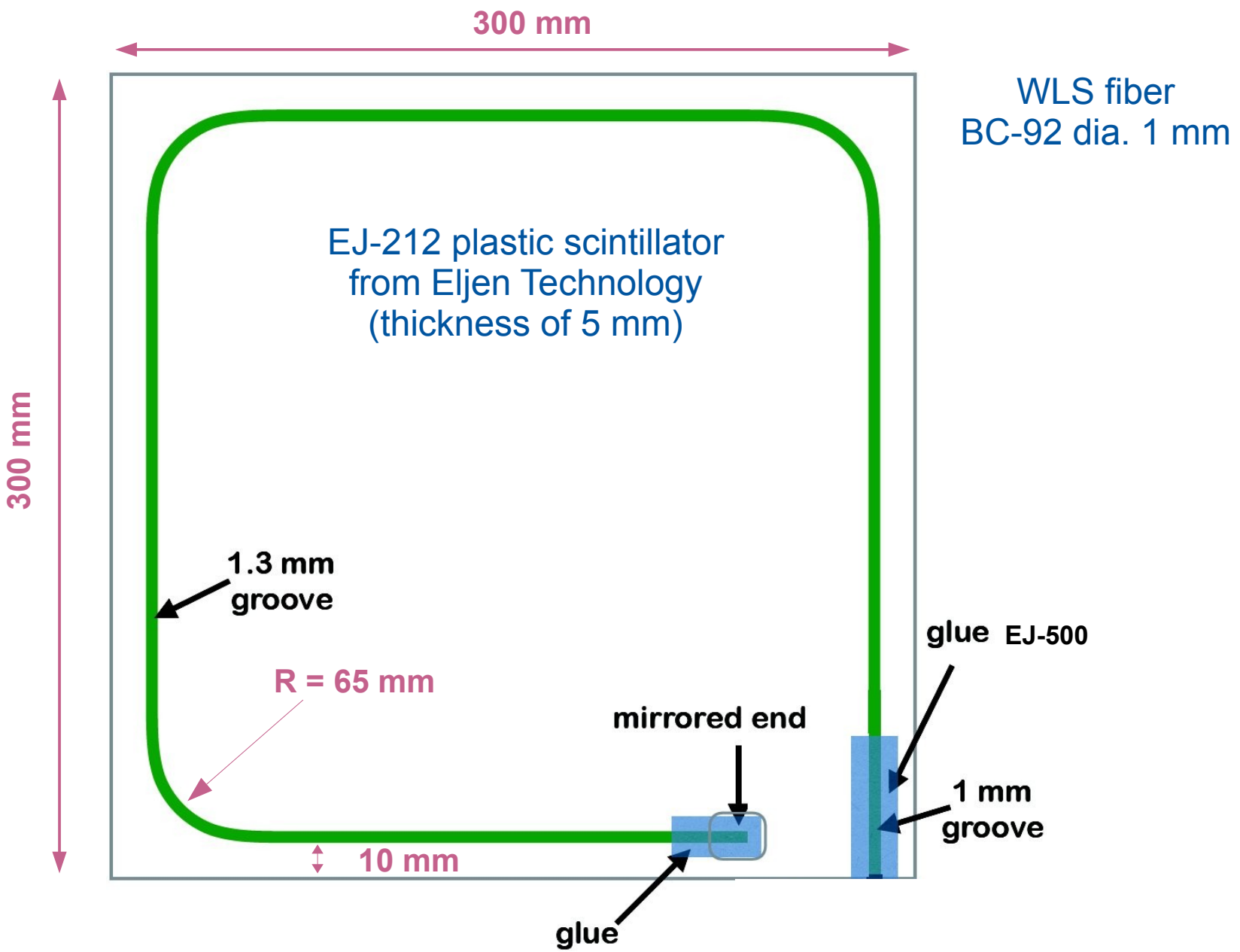
The total weight of one unit is about 25 kg



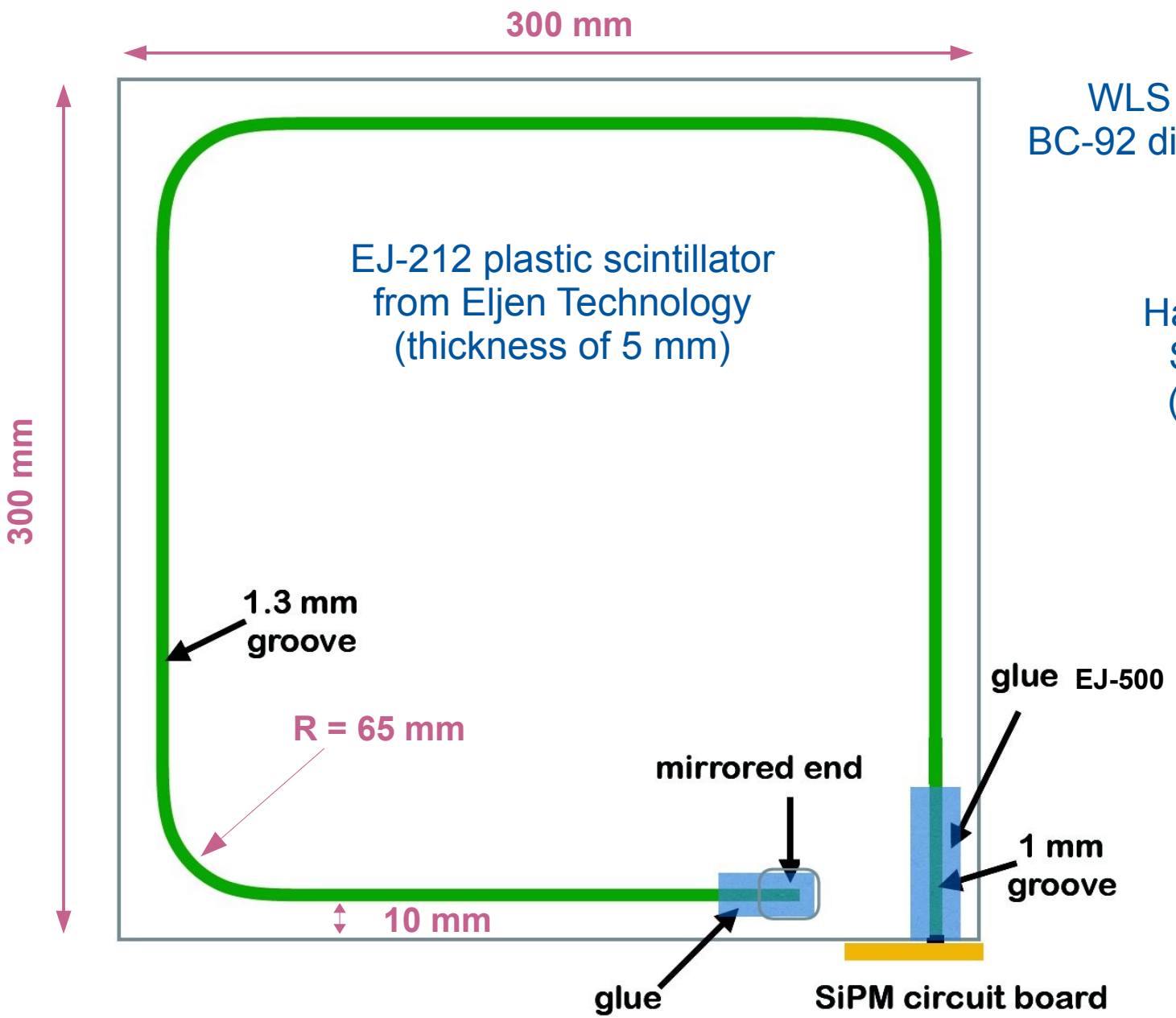
Scintillator tile



Scintillator tile



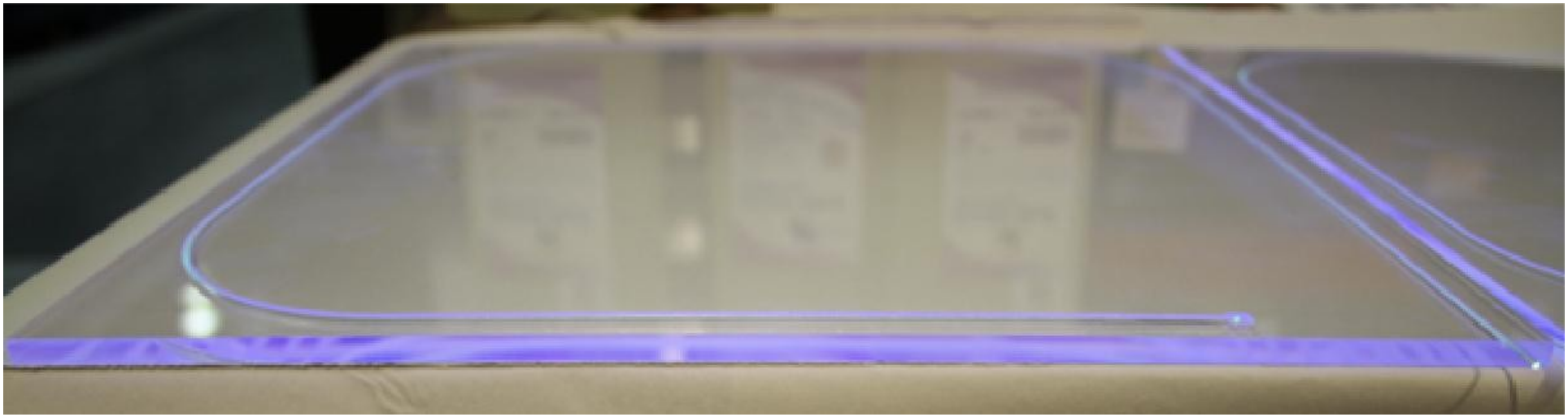
Scintillator tile



WLS fiber
BC-92 dia. 1 mm

Hamamatsu SiPM
S13360-1350C
(1.3 x 1.3 mm^2)

Test measurements

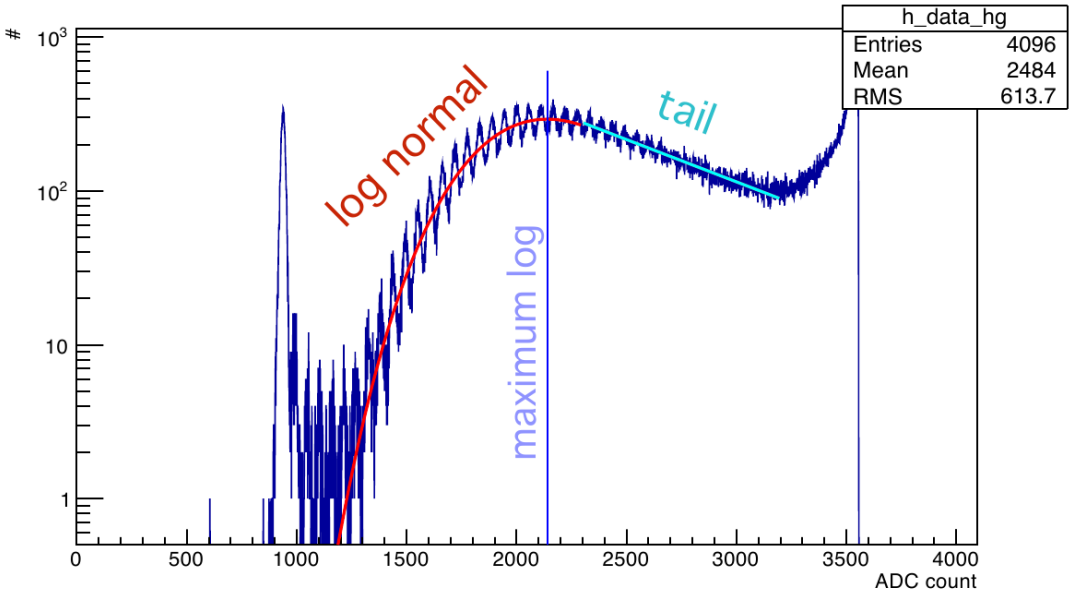


Test measurements of tiles in a coincidence:

> 20 p.e. / MIP

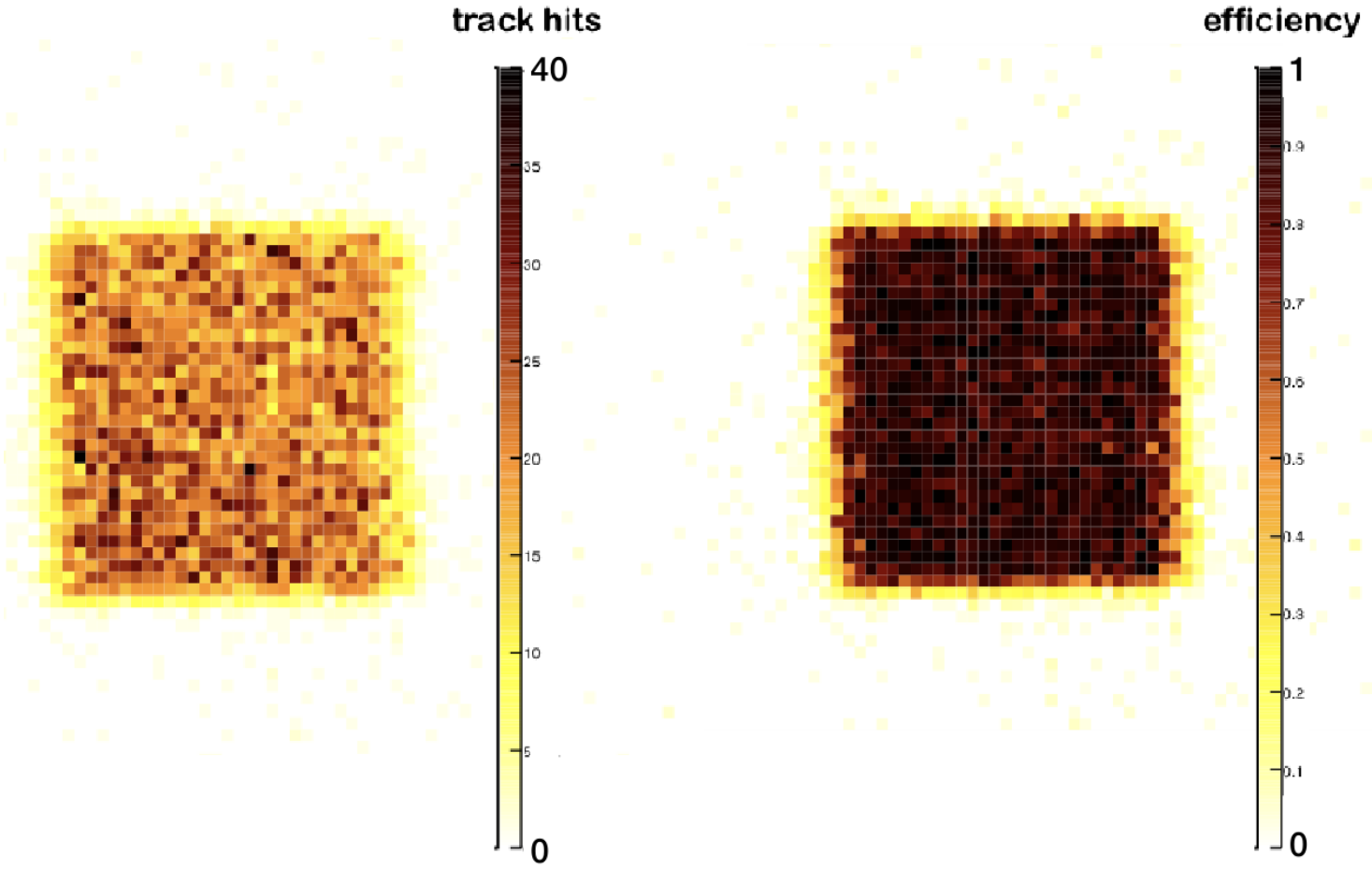
the MIP and pedestal peaks are well separated

only very small change of the MIP peak position with temperature



Homogeneity

The first measurement in the muon tower at the KIT (thanks to Darko and others)

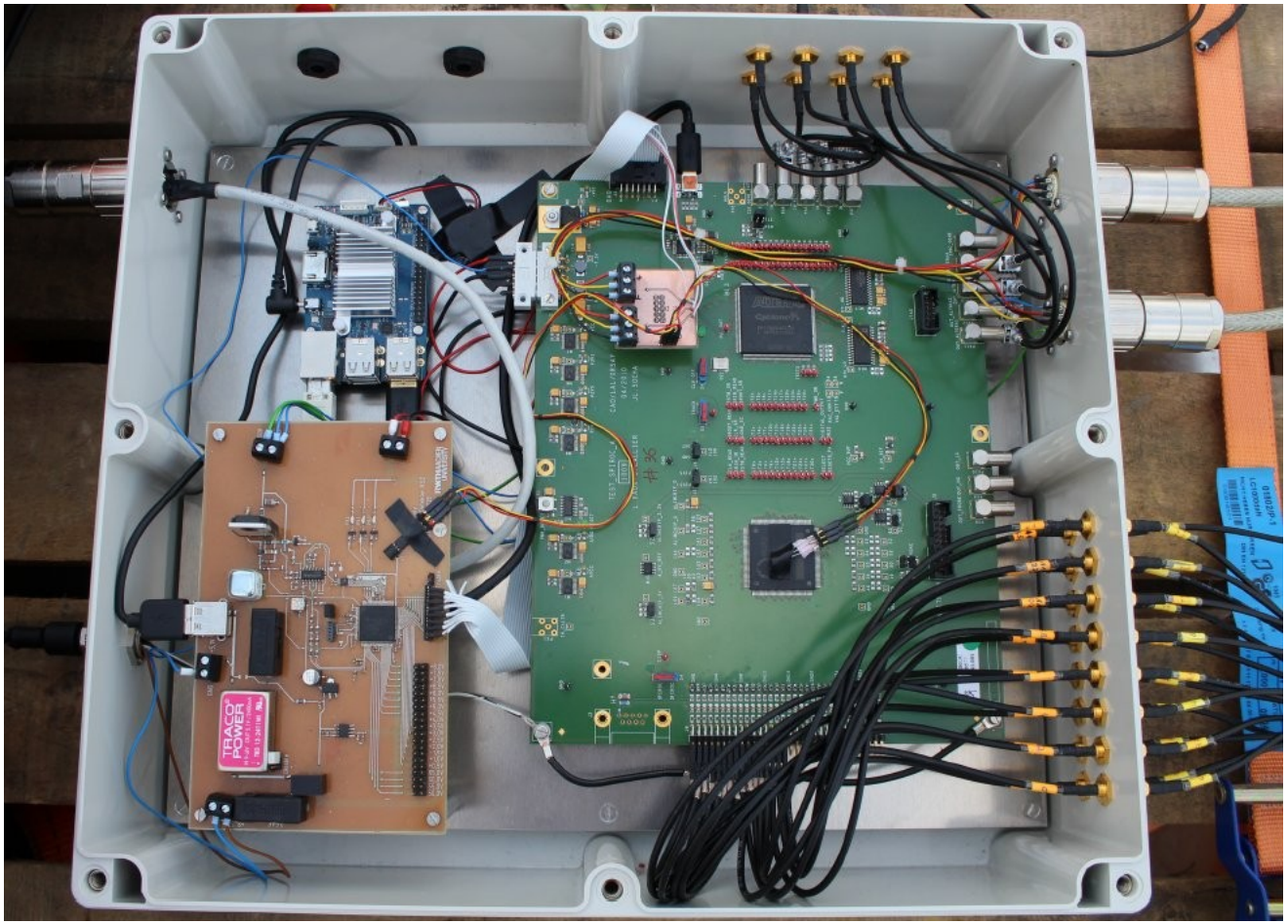


We would like to repeat the measurement w/ the whole MiniAMD module

Electronics

Temperature sensors
(also close to SiPMs)

The EASIROC evaluation
board (w/ 32 channels)



PSU
(HV generation
and regulation)

HV for SiPMs
means 50 – 73 V

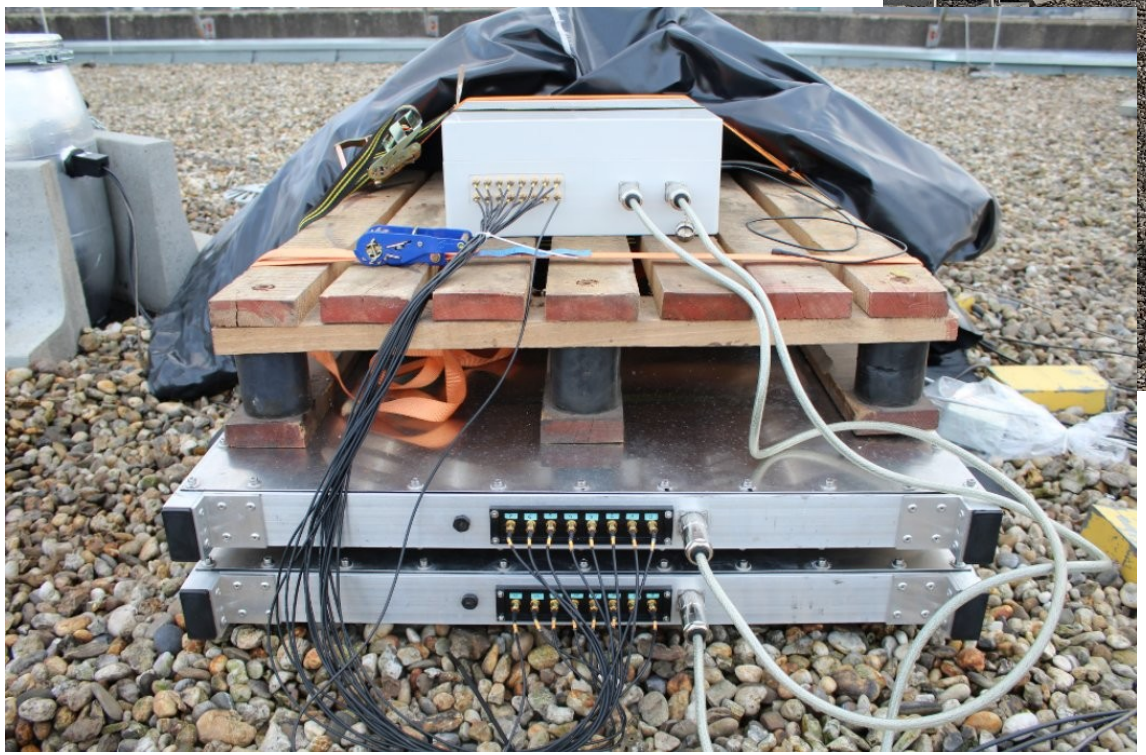
Test outside

Two MiniAMD units were built and placed on the roof of our institute

Self-triggering and an external trigger from a small cosmic-ray array

External trigger rate ~0.02 Hz

Self-trigger rate ~100 Hz



Working fine

Data analysis is under way

Evaluation of SSDs

Sorry, no measurements yet

Two new PhD students and voluntary assistant have started this month (under the supervision of T. Bretz)

Available parts:

Two MiniAMD units, HV power supply, oscilloscope, PC

Missing parts:

Two PMTs with passive base

PVC tubes, springs, cables and flanges