

Tile detector mechanics - status update -

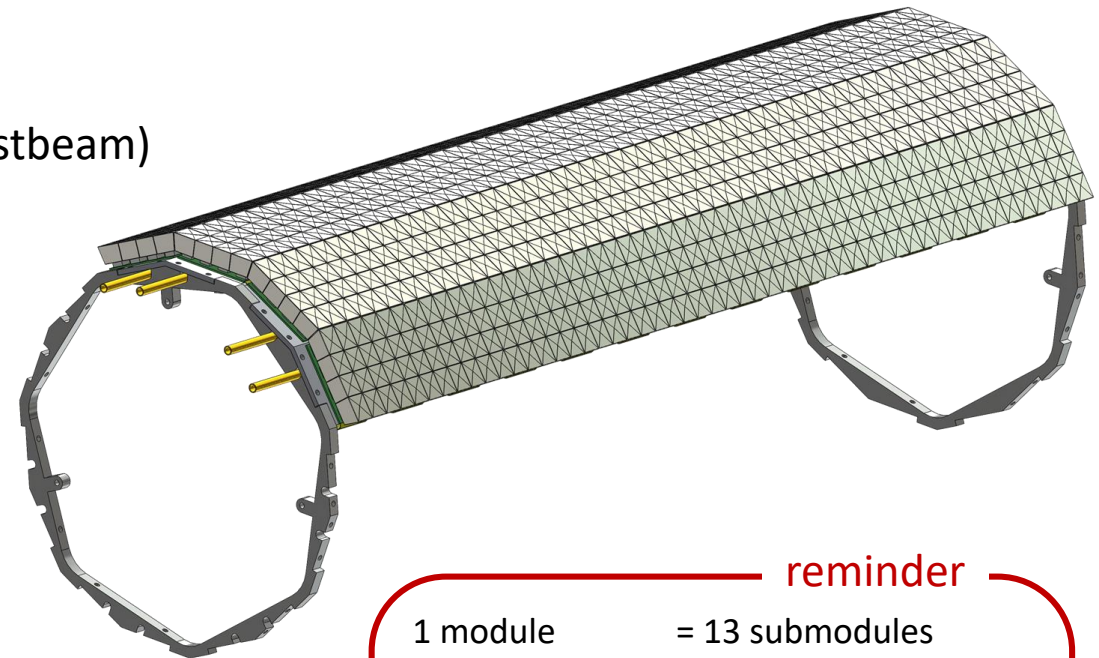
June 22, 2020

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Tile detector plans 2020

- goal for this year:
 - **two modules** fully assembled, QA'd and commissioned (testbeam)
 - production and QA chains established in the lab
 - ready for full production
- mechanics-wise, we need:
 - 832 tiles (416 centre + 416 edge), plus foils for wrapping
 - 832 SiPMs
 - 52 matrix-flex boards
 - two tile module boards (TMB)
 - two cooling plates
 - one set of endrings
 - plus tools to wrap, glue, assemble, ...

→ aiming for assembly in July



reminder

1 module	= 13 submodules + 1 TMB
1 submodule	= 2 matrices
1 matrix	= 16 (tiles+SiPMs) + 1 matrix-flex board
1 TMB	= 13 MuTRiGs (+ components)

Status of scintillating tiles

- **scintillator overview**

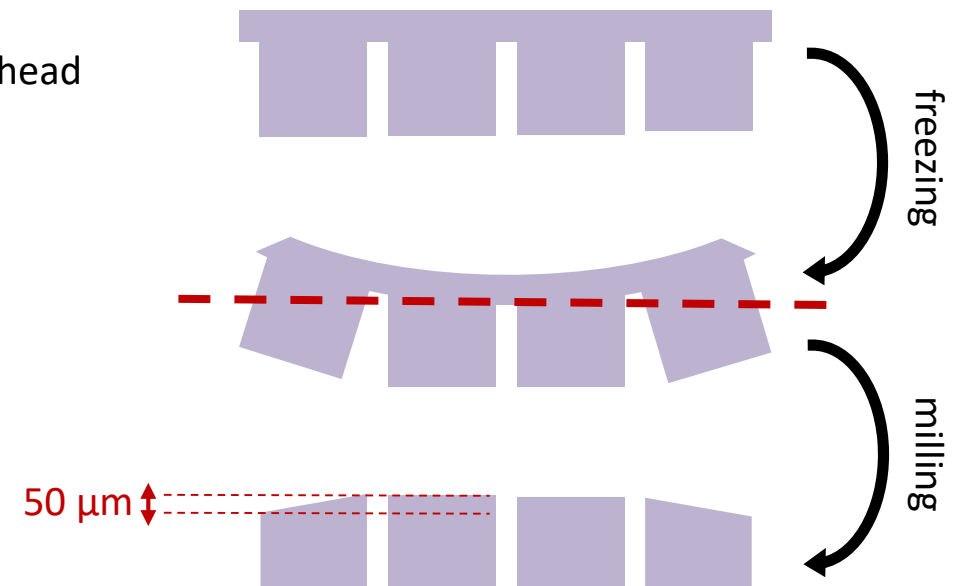
- in total 10 plates (262 x 36 x 5.5 mm³) at KIP
 - yield: 8 matrices (= 128 tiles) per plate
- production at mechanical workshop by David Jansen

- **production updates**

- tile production tests by David in first two weeks of June
- issue 1: surface quality worse with newly ordered milling heads
 - **solved**: "coarse" milling with new heads, surface finish with spare head
 - note: tile-SiPM surface not affected
- **issue 2**: tiles are pushed apart during freezing step on ice vice
 - **not fully solved yet**
 - can be mitigated by cutting plate into smaller pieces
 - difference in height still measurable (50 μm)
- current status: **2 plates finished** (both with flaws)
 - will have a look at them today

amount:

for two modules



Status of electronics

✓ SiPMs

- 1000 pieces at KIP by now

• matrix-flex board

- design signed off by ILFA
- cost of 400 pieces is > 5k € → must be ordered by University
- expected in ~5 weeks

• TMB

- routing of ASICs to connectors finished
- "dummy" board ordered for mounting tests
 - received mounting hole positions from Jens on Friday
- MuTRiG bonding tests by Ralf Achenbach

amount:

for two modules

for full detector

for one module

Status of support and cooling

- **cooling plates**

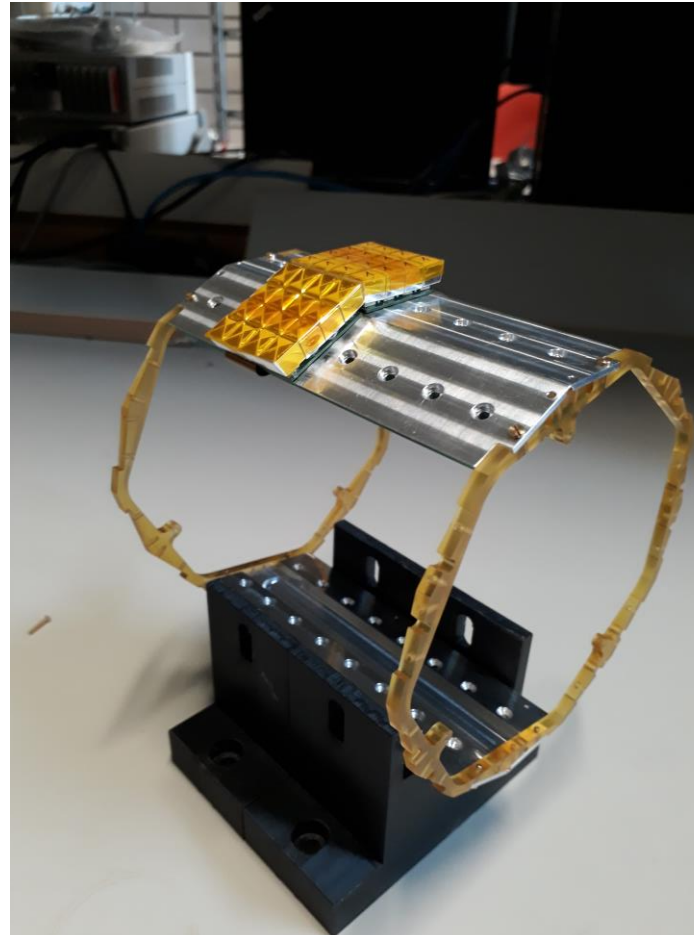
- two shortened cooling plates at KIP,
 - for assembly testing
- need: two full-length cooling plates
 - TMB mounting holes still missing

- **cooling pipes**

- 25 pipes at KIP workshop
- need to be bent in shape

- **endrings**

- one set of endrings made from PEI at KIP
 - very "flexible"
 - need to test deformation under weight



amount:

for two modules

for full detector

for one station

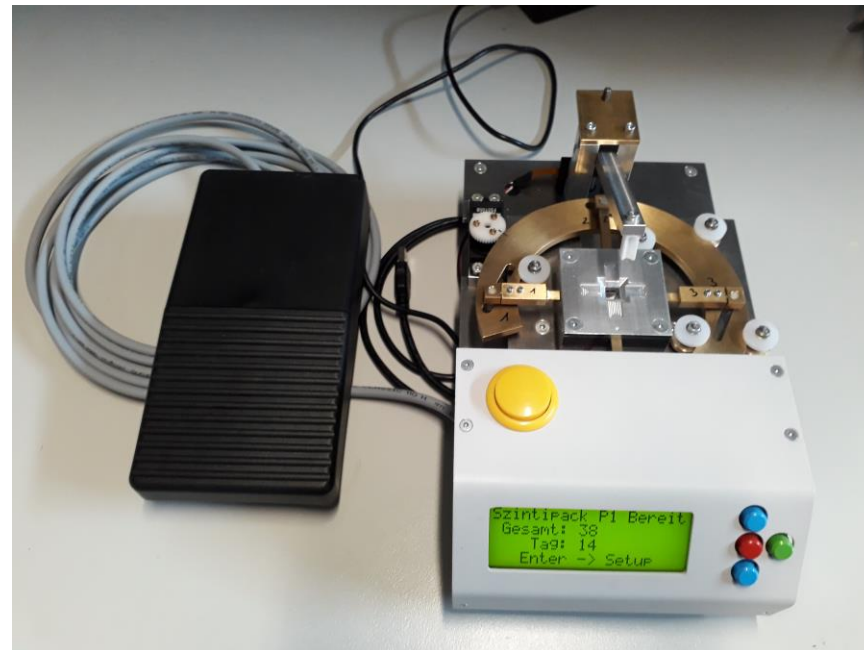
Status of assembly tools

- **wrapping tools**

- wrapping tool #1 (centre tiles) is **ready**
- wrapping tool #2 (edge tiles) in production at KIP workshop
- still needed: cutting of foils (~ 5 sheets) → **this week**

- **gluing tools**

- one is ready in the lab
- 3 more at KIP workshop
 - alignment still needed



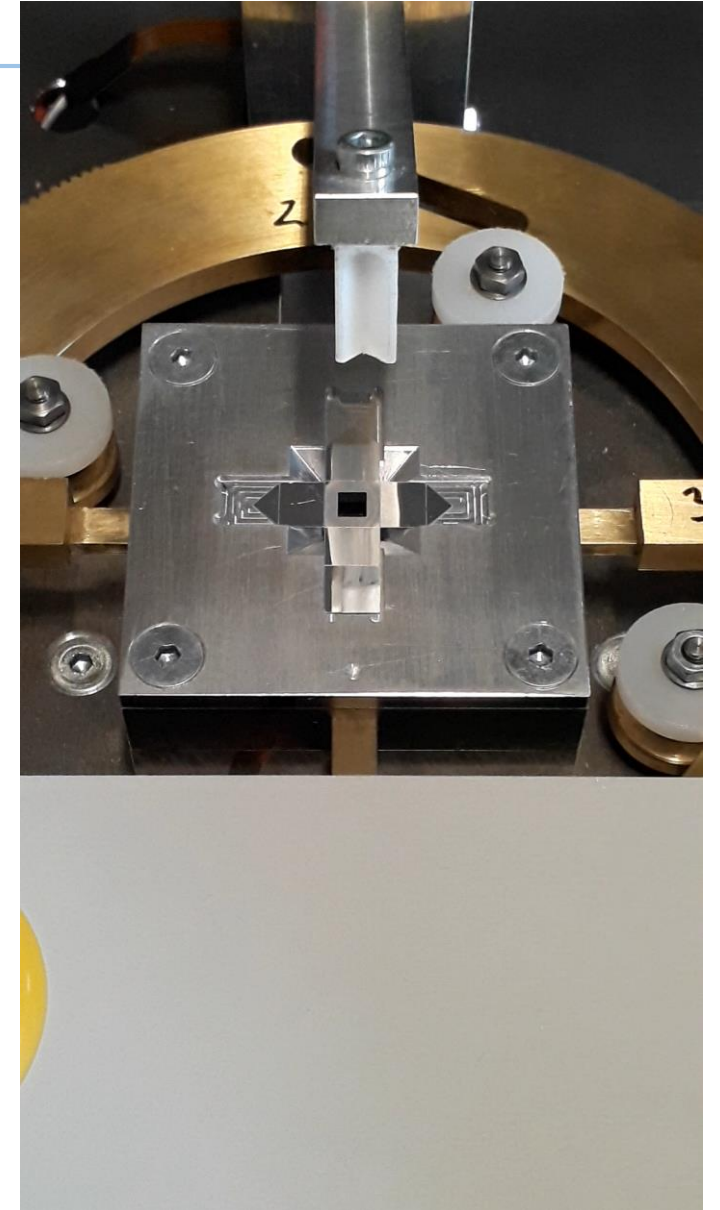
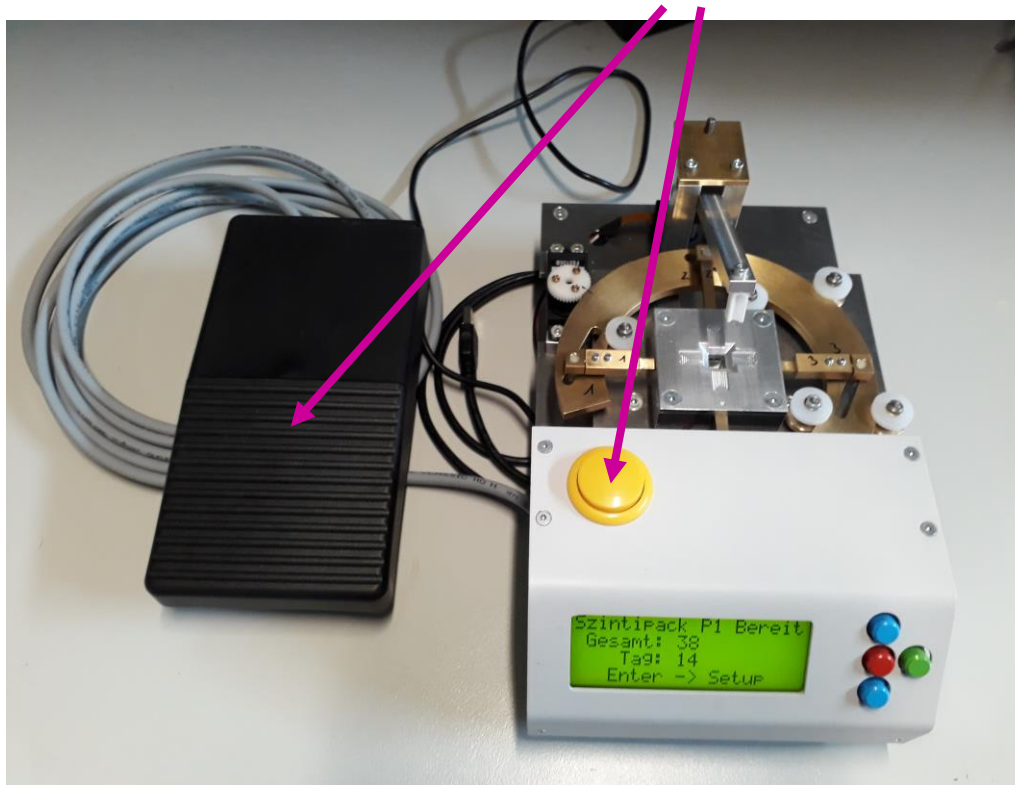
amount:

80 tiles per hour
(estimate only)

4 matrices per day

Insert: wrapping tool

- constructed by Knut Azeroth (electronics workshop) and Christian Herdt (mechanical workshop)
- wrapping sequence controlled by Arduino
 - move through sequence by pressing "Enter"



To do (an incomplete list)

- **lab preparation**
 - ! cleaning and storage
 - ! setting up working stations (mechanics + QA)
 - general question: move to cleanroom for (some parts of) production?
- **"shopping"**
 - electronics components
 - ✓ FPC connectors, temp sensors
 - do we have enough capacitors, resistors, ...?
 - gluing materials (glue, nozzles, ...)
 - ✓ storage solutions (tiles + matrices)
 - more ESR foil sheets
 - we have easily enough for two modules, but not for the full detector
- **testbeam setup preparations**