

Update on SFH and UTS for PRM

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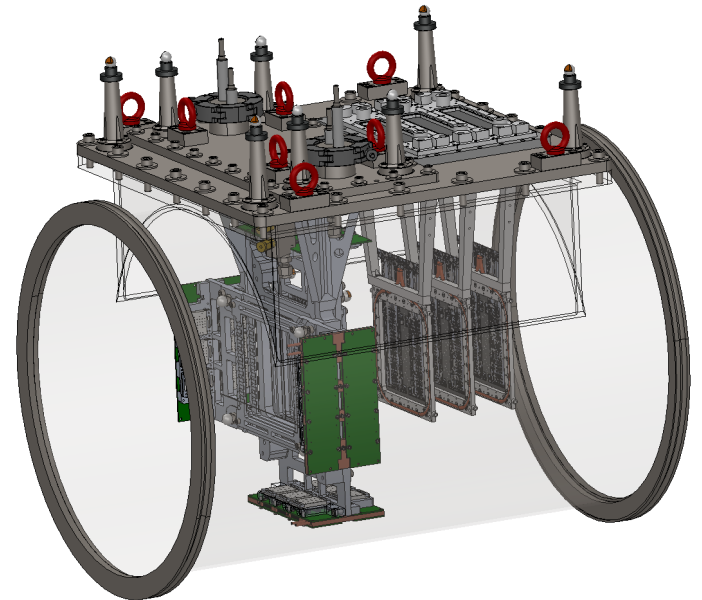
Institute for Hadronic Structure and Fundamental Symmetries

Physics Department

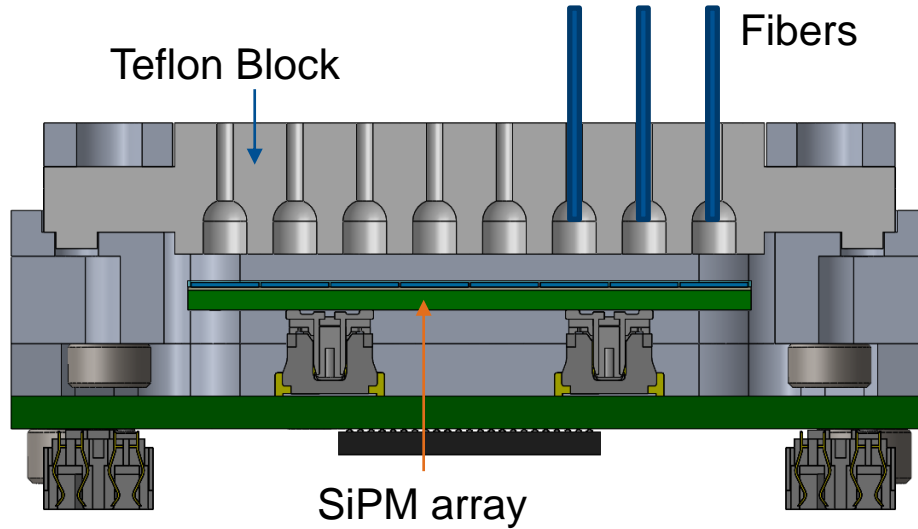
Technical University of Munich (TUM)

Joint COMPASS / AMBER Technical Board

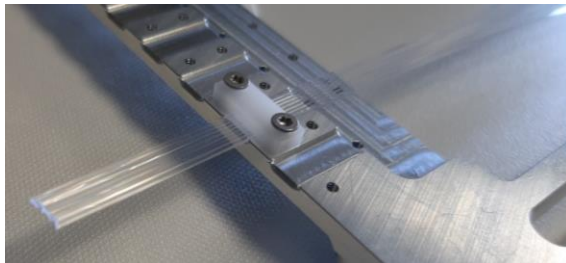
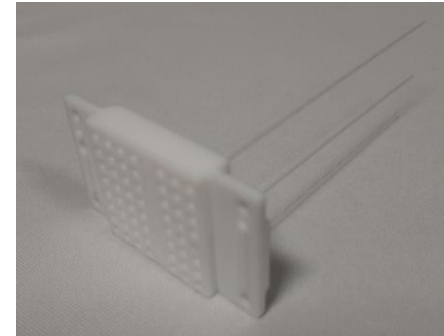
April 19th, 2022



SFH: Fiber Coupling and Mechanics



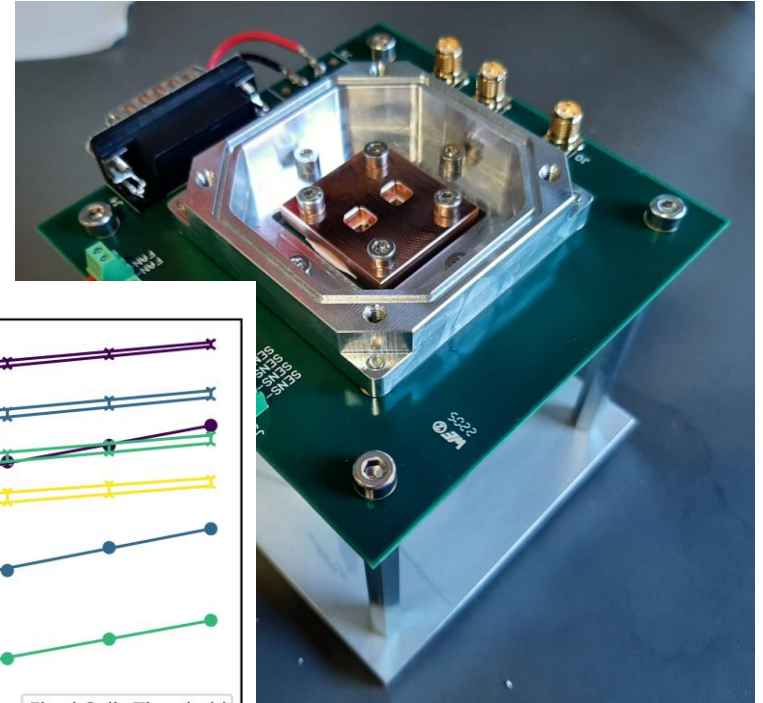
Currently testing detector mechanics and coupling of fibers to SiPM arrays to maximize light yield



Fiber clamping

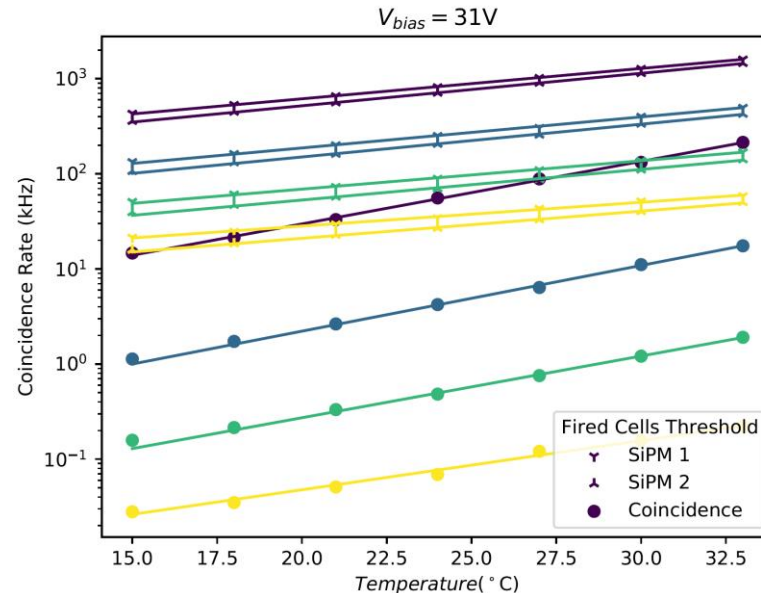
SFH Lab Tests: Coincidence

- Temperature controlled environment for dark count measurements
- Temperature dependency and coincidence suppression

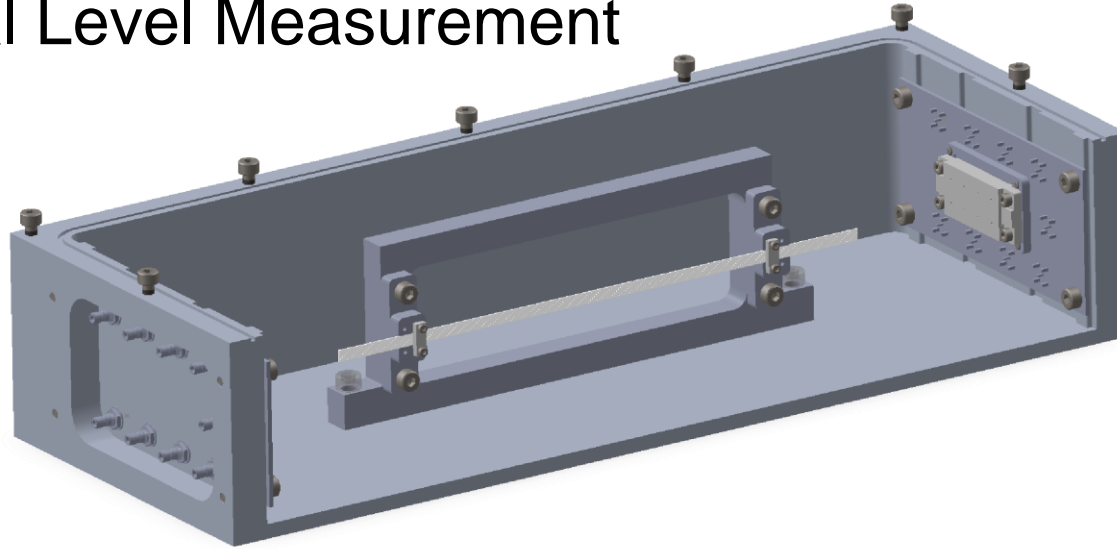


Dark count rate can be suppressed via coincidence

- Number of photons per event crucial for threshold



Signal Level Measurement



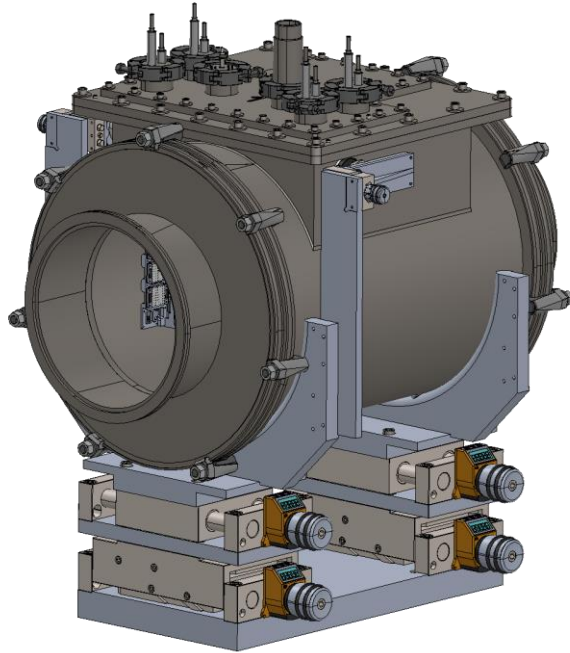
- Simplified setup with 8 fibers to measure light yield and expected signal height in SiPM
- Fiber length, mechanics for holding and coupling to SiPM similar to SFH
- Stand-alone readout and DAQ (MSADC)
- Production foreseen to start within the next days
- Parasitic test in the first half of May downstream of COMPASS

UTS Vessel



- First vessel prototype here in Munich, second one will be produced soon (dep. on workshop capacity), can then be send to CERN
- For UTS test this year still to be clarified:
 - Beam windows / flanges to close the volume e.g. milled down aluminum flanges
 - Support and holding structure for the UTS

UTS Support



- Most parts for supports are in stock in Munich, some parts need to be produced in local workshop
- Can in principle be finished until test campaign in October
- How much precision and flexibility in alignment required?

Plan for this Year

Test campaign #1: Initial tests of end-to-end light yield

- Prototype with 8 channels to test light yield and coincidence trigger rates in beam
- Setup as shown before
- Target location and time frame: beam-dump area, first half of May

Test campaign #2: Test of SFH prototype

- Prototype of SFH detector
- Target location and time frame: beam-dump area, earliest end of Juli

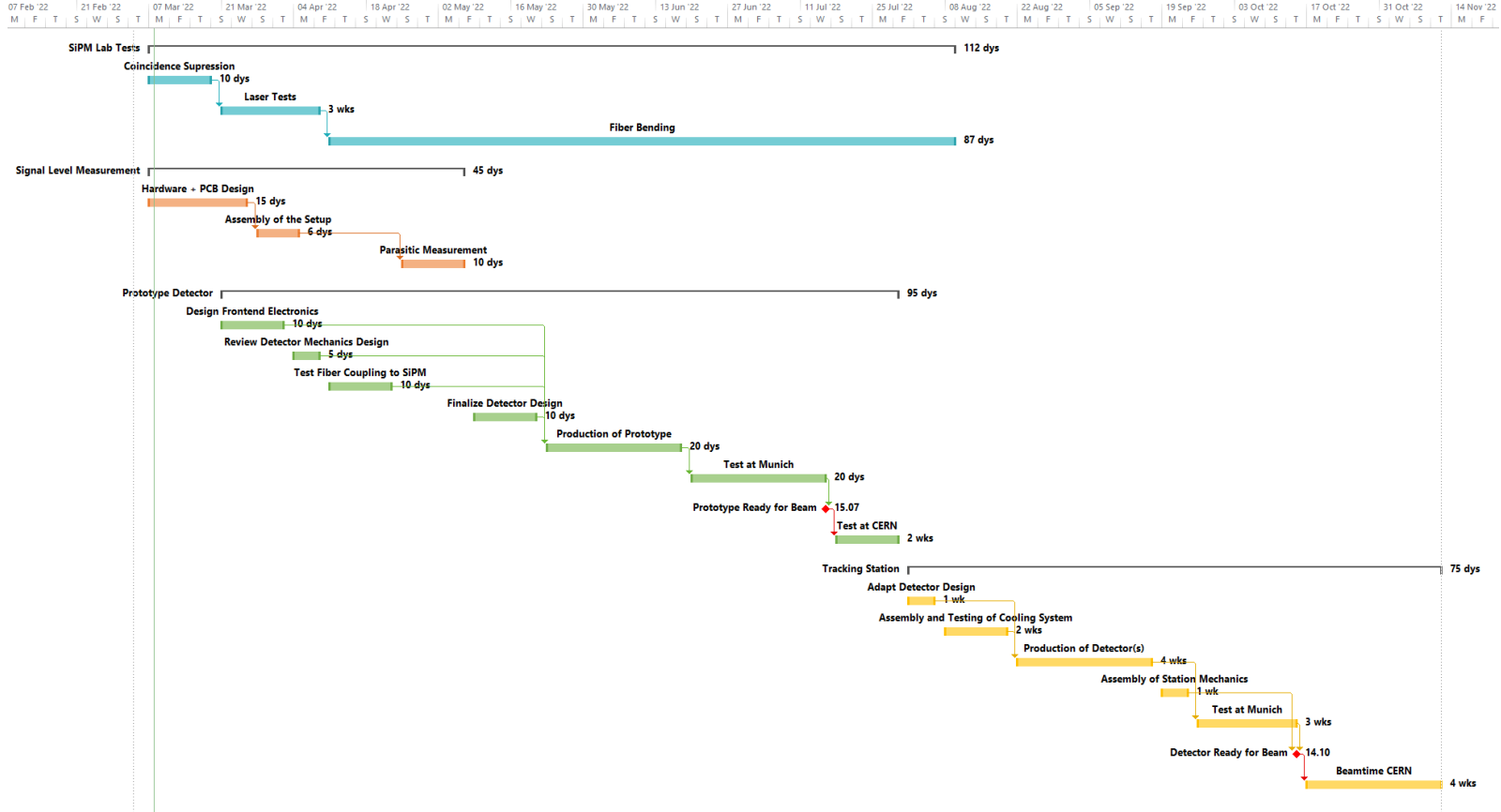
Test campaign #3: Integrated testing of prototype UTS

- SFH prototype + SPD prototype
- 64+ fibers per plane, full 4 planes (2 X, 2 Y)
- Target location and time frame: October, dedicated AMBER test

Requirements:

- Campaign 1: only space and electrical power required, downstream of COMPASS
- Campaign 2 & 3: Electrical power, network connection, fibers for connection to DAQ

Timeline



Thank you for your attention!