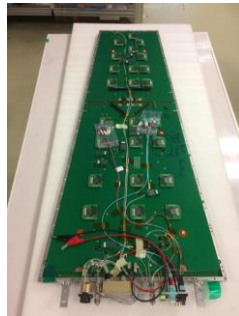
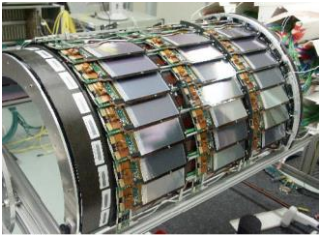
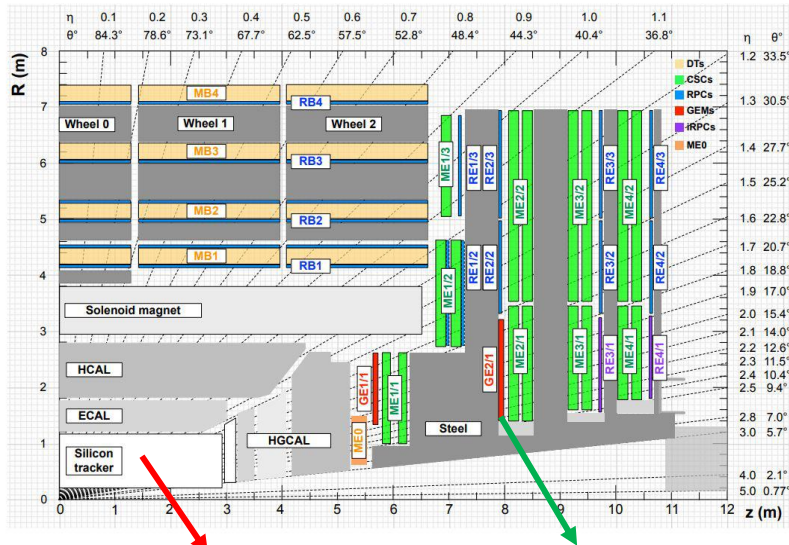


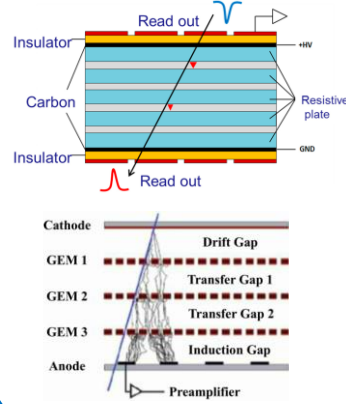
Instrumentation in HEP and beyond

1. CMS experiment @ CERN LHC



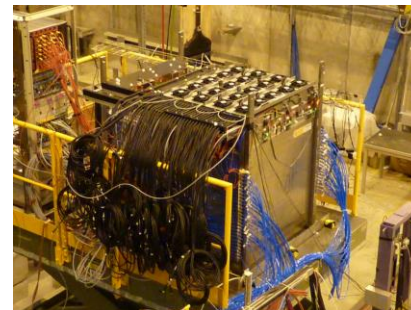
- Silicon Tracker construction
- Gaseous Muon detector upgrade

Advanced gaseous detectors (RPC, GEM)

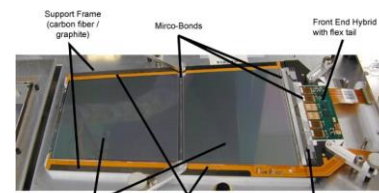


2. Detectors for experiments at future colliders

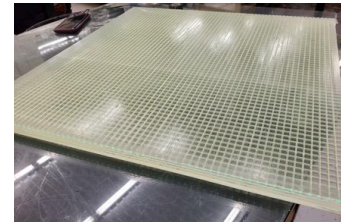
- R&D of high-granularity, gaseous detector based 5D calorimeter



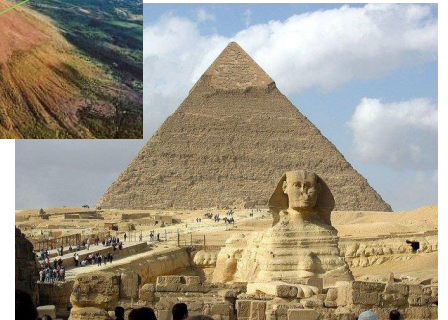
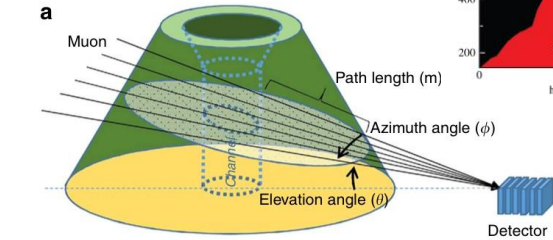
Silicon sensors



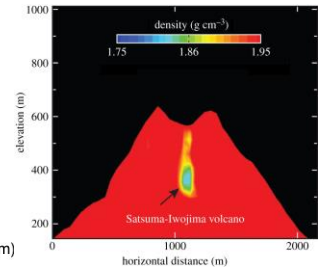
Scintillator counters



3. Muon Radiography



- R&D of muon telescopes, software and algorithms for muography applications in volcanology and archaeology



Examples of thesis topics

CMS / Future Colliders

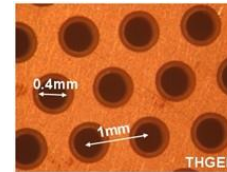
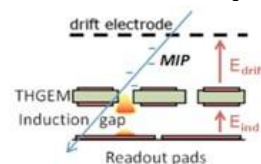
- **[Ma]** Optimization of triple-GEM timing performance using Garfield++ simulations
- **[Ma]** Improved muon reconstruction using upgraded iRPC system
- **[Ba]** Optimization of setups for Tracker module QC during assembly
- **[Ba/Ma]** Analysis and trend monitoring of strip noise in CMS Tracker
- **[Ba/Ma]** Machine learning based calorimeter shower reconstruction using test beam data of SDHCAL prototype or public data of CMS HGCALE

MUon RAdiography of Mt. VESUVIUS (Muraves)



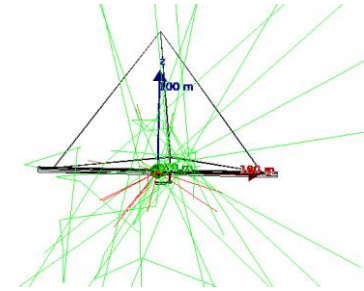
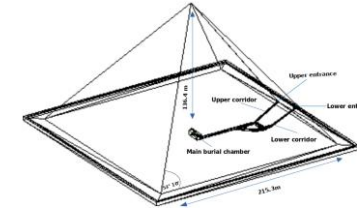
- **[Ba/Ma]** Development of automated data quality monitoring system

Portable Muon Telescope



- **[Ba/Ma]** Thick-GEM development (simulation and/or prototyping)
- **[Ba/Ma]** Muon momentum measurements via multiple scattering or time-of-flight (simulation)

Scintillator Detector for Egyptian Pyramids (SciDEP)



- **[Ma]** Development of full simulation chain including cosmic muons, model of pyramid, detailed detector setup
- **[Ma]** Implementation of 2D/3D image reconstruction algorithms
- **[Ba/Ma]** Design and test of new scintillator+SiPM detector and electronics

Medical applications (with UZ Jette)

- **[Ma]** Simulation studies for clinical Flash Therapy (radiotherapy)

Under discussion