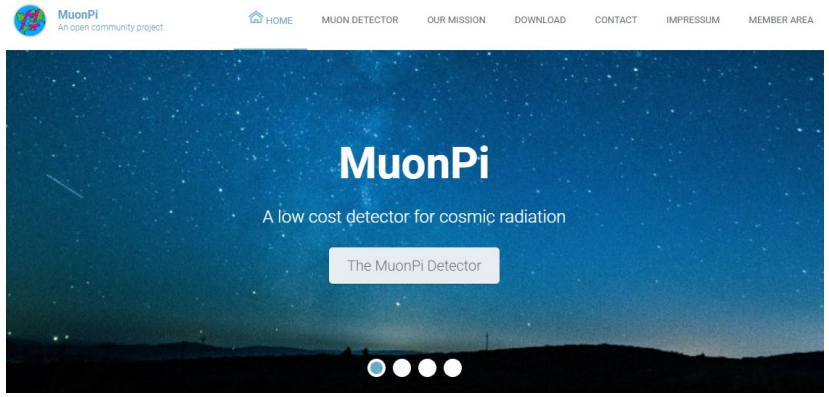
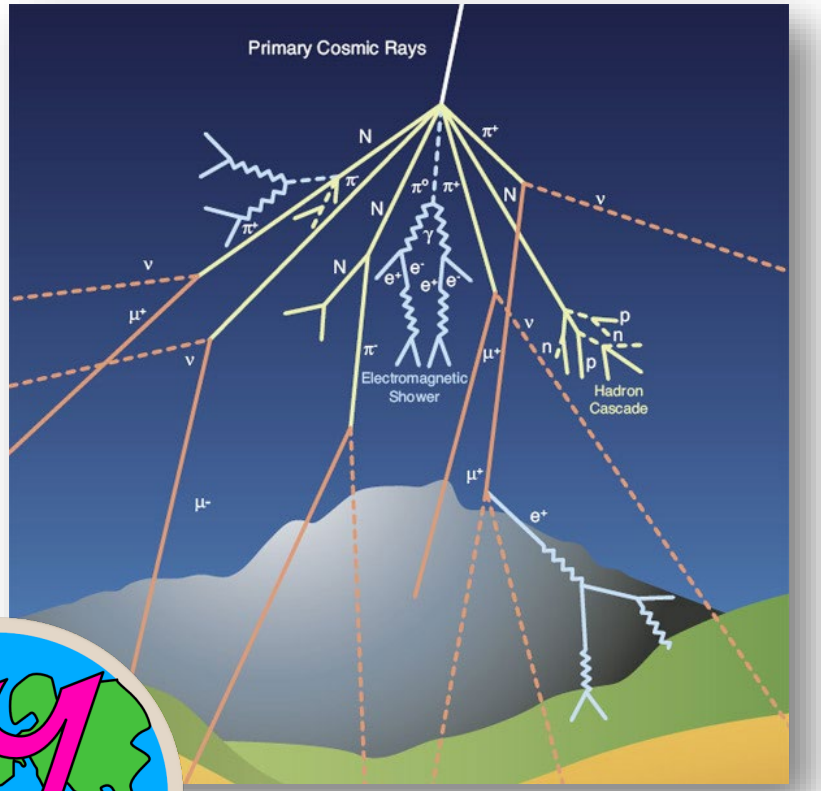
MuonPi: a low-cost detector for cosmic radiation

- The MuonPi Project is an open-source **Raspberry Pi**-based system using an inexpensive plastic scintillator + SiPM photo sensor to detect **muons** from cosmic air showers
- Cosmic radiation are high-energy particle rays produced in outer space which constantly impinge on the Earth's atmosphere.
- These particles can produce **particle showers** when they interact with atoms in the upper atmosphere
- The **MuonPi Project** aims at investigating these cosmic showers by establishing a network of **low-cost Raspberry Pi-based particle detectors**



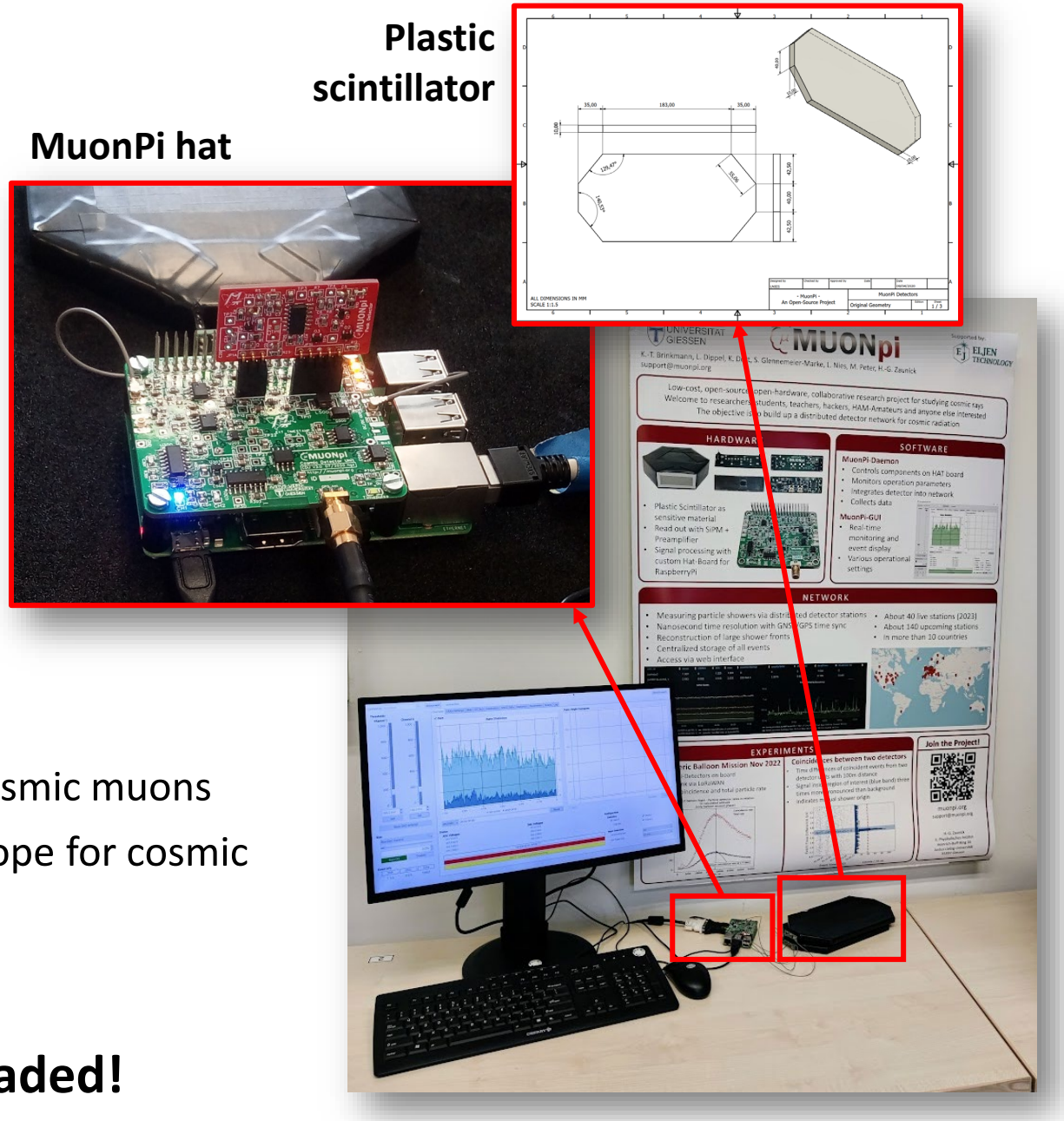


MuonPi setup

- Raspberry Pi board (3B+ or 4)
- Raspberry Pi MuonPi hat (SiPM voltage bias + readout) to be **built** and **assembled**
- SiPM + scintillator (to be **constructed**)
- Python software for event display and reconstruction (Grafana for data aggregation)

Plastic scintillator

MuonPi hat



What is does

- The system can show in real-time the passage of cosmic muons
- Data is aggregated from all MuonPi installed in Europe for cosmic ray reconstruction
- A live map is available for constant monitoring

→ The system can be expanded and upgraded!

Resources

- MuonPi Wesbsite: https://muonpi.org/
- MuonPi Wiki: https://wiki.muonpi.org/ with step-by-step tutorials for Raspberry Pi hat assembly and detector construction
- EasyEDA instance with all PCBs designs and parts BOM: https://oshwlab.com/MuonPi/
- GitHub repository with all the software needed: https://github.com/MuonPi/muondetector