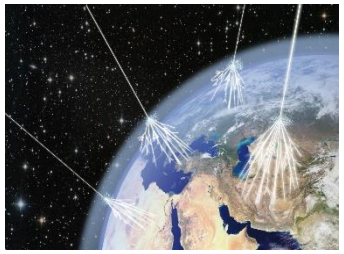
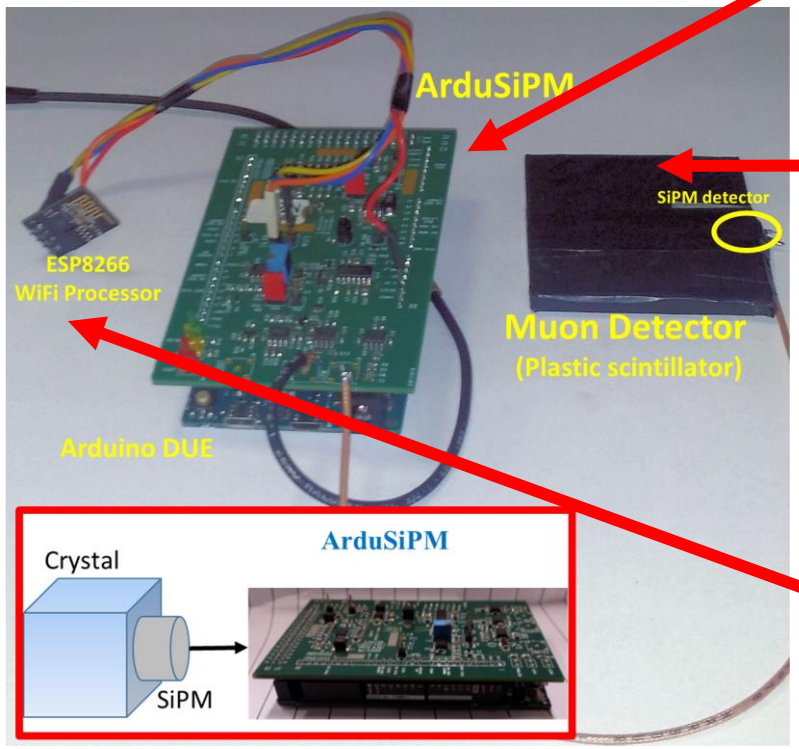
An educational distributed Cosmic Ray detector network based on ArduSiPMusing NTP protocol as time distribution and IoT technology for data aggregation.

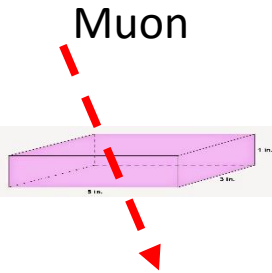
Valerio.bocci@roma1.infn.it



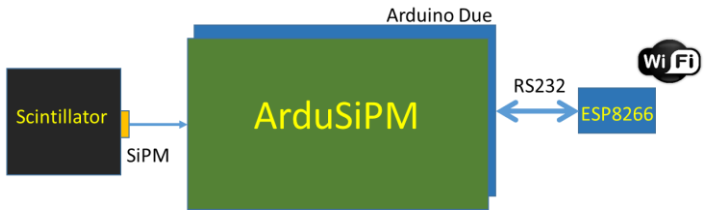


ArduSiPM is an Hardware software module for SiPM detector readout based on Arduino DUE and ArduSiPM Shield, commercially available as educational kit for School and Institution.

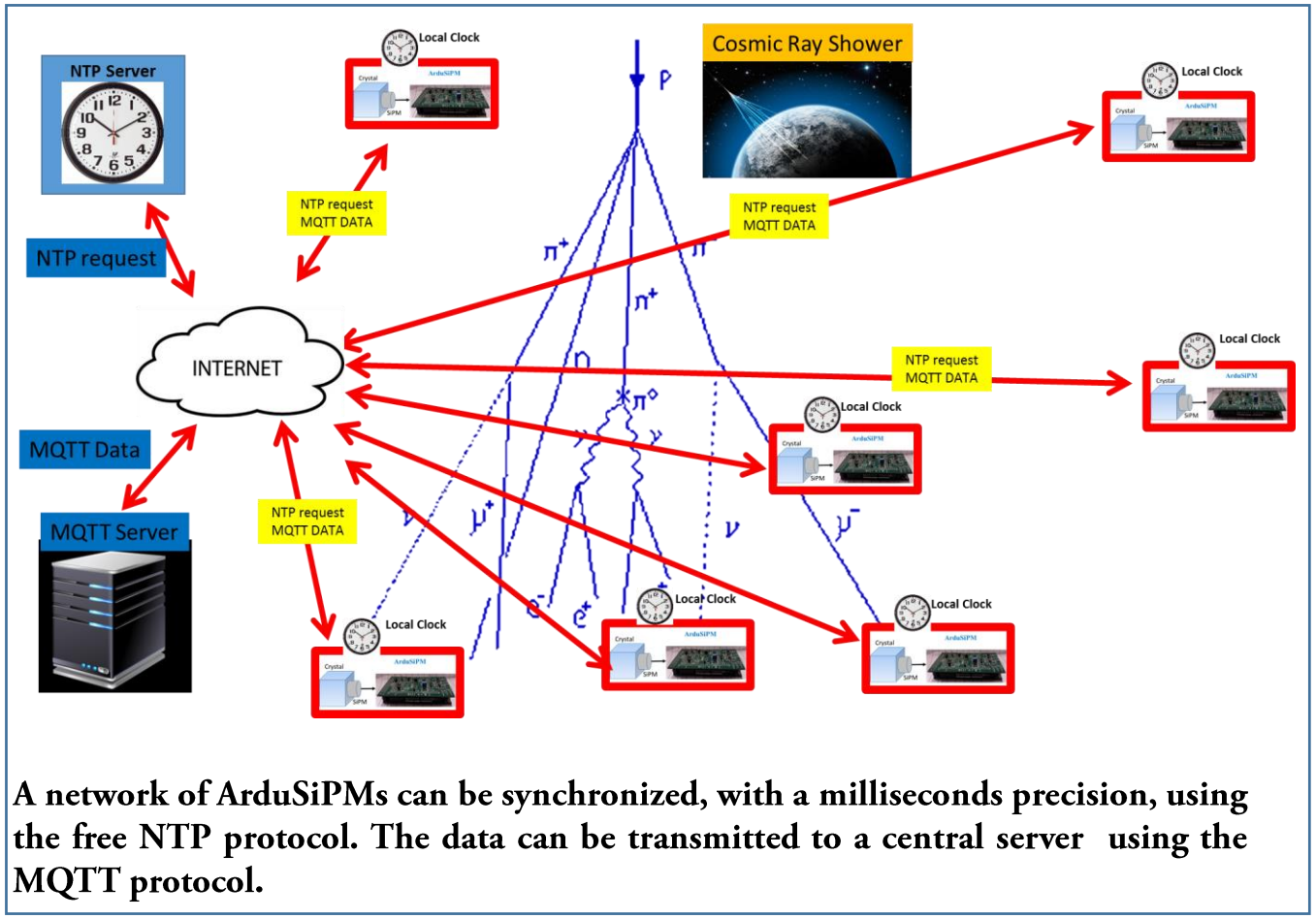
The Silicon Photomultiplier coupled with a cheap plastic scintillator realize a 6x6x0.5 cm muon detector good to detect cosmic ray.



Adding an ESP8266 WiFi a wifi module with processor capability it is possible to use ArduSiPM as IoT (Internet of Things) device, to use as main block of a distribuited detector.

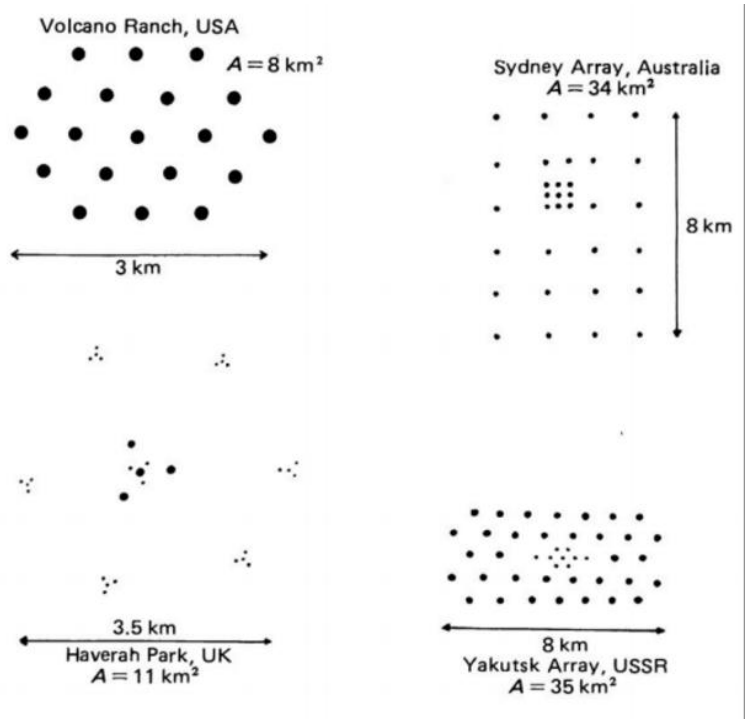


Thanks to the Internet infrastructure become possible to build a low cost virtual experiment. Using a wide area network of ArduSiPMs we can search for Ultra-high-energy cosmic ray coincidence: in this way it is possible to show how the real Cosmic Ray Array experiments work.

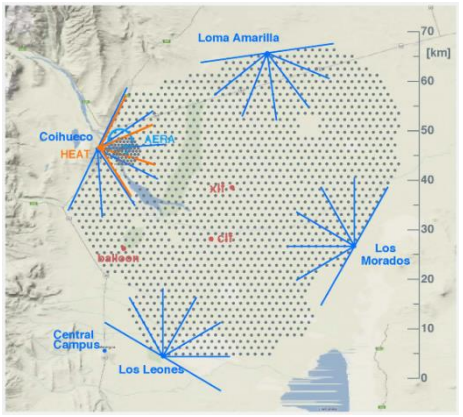


A network of ArduSiPMs can be synchronized, with a milliseconds precision, using the free NTP protocol. The data can be transmitted to a central server using the MQTT protocol.

World's famous Cosmic ray Array experiments



Auger (Argentina)



Telescope Array Utah (USA)