



Enabling Cosmic Ray Studies Worldwide

Global Cosmic Ray Studies

Projects for High School Students

globalcosmics.org

<https://icd.desy.de/e49245/>



UNIVERSITY OF BIRMINGHAM

Opportunities . . .

- Learning from Others
 - What projects are out there?
 - What are the similarities & differences between projects?
- Adding New Projects
 - Rome Workshop
 - ISE Summer Academy
- Do We Collaborate?

- Sharing Data
 - Open Cosmics initiative (Achintya)
 - Data analysis. Tools are out there! (VISPA)

. . . But We have Differences

- Education vs. scientific experiment focus
- Detector types
- Detector accessibility
- Availability of data
- Availability of analysis tools
- Role for teachers/scientists
- What high school students do

Make This Useful for Teachers – How?

- Create network of Cosmic Rays school educational projects?
- Create something similar to the Particle Physics Masterclasses?
- What can be done with datasets?
 - Some projects have made their data public (Of particular interest for schools with no detectors)
 - Do we try to get all the data?
 - Do we provide all data in one format?

Opportunities

- First priority: Student-designed experiments in schools
- International Cosmic Day – shared data taking
- International Muon Week – shared muon experiments
- Use shared global data to encourage more participation and strengthen collaboration.
- What can a globally dispersed detector accomplish?
 1. Single muon rates
 2. Large Array correlated air showers

Single Muons

Take standard flux data over a long period of time: establish baseline; perhaps correct for pressure dependence.

1. Search for change in nominal rate, e.g., due to a coronal mass ejection on the sun that changes the earth's magnetic field.

When an abnormal rate is observed, send an e-mail request to detectors worldwide to capture rate histograms for a day surrounding the target time and share via a website.

2. Study rates versus pressure; altitude; latitude
Tailored for rates from single muon setups

Correlated Large Array Data

Search for showers that cover a large area on the earth.

3. Rare Events Study

Study Search for a cosmic ray air shower event worldwide correlated in time or for clusters of showers anywhere.

If found in any set of detectors, ask groups worldwide to search for similar cluster within ~ 1 millisecond of the target time.

Next Steps

Develop globalcosmics.org

Associated with IPPOG website, but independent

Need requirements document

Estimated production date, end of 2018

Meet again?

Set up & pilot alert system for single muons?