

Part 1

Cosmic rays! What are they? Where do they come from? How do we see them?
Is the cosmic ray flux the same in all parts of the world? Let's try to find out!

QuarkNet members, join us in the fourth annual International Muon Week. During the week of April 11 to 15, we will recruit as many members as possible to collect data for the entire week. Leading up to April 11, make certain that you have your CRMDs running and collecting data. Detector help is always available within the Cosmic Ray e-Lab at the HelpDesk (upper right of e-Lab web page, look like a life ring).

To prepare for the week, we need each of you to fill out this electronic form found at the links below. It's short and very important. It will allow us to create an international map showing participating schools. (Thanks to Jeff Rodriguez for creating this tool). You need to access both links, to add your school to the map and to share contact information.

Cosmic map redirect <http://rodshome.com/CosmicMap/CosmicMap.html>

Contact form <http://rodshome.com/CosmicMap/Contact/contactform.php>

Please collect flux data for the week of April 11 to 15. After uploading the data to the Cosmic Ray e-Lab (www.i2u2.org/elab/cosmic), run a flux analysis on the week's data and save the plot. Go to "View Plots" and open your saved flux plot; capture the URL and paste into the input box below. (We'll resend the link to those that sign up for the event).

Make certain the CRMDs are working properly and collecting data. It is not necessary to collect data for 100% of the week, if that is not feasible. Some data is preferable to none. Use the following commands:

ST 2 5, SA 1 and TL (for blessing) as well as WC 00 2F for three fold coincidence (the two digits in the middle are zeros, by the way). Have the counters stacked directly on top of each other.

If you need a new CR e-Lab account, please submit here:

e-labs@fnal.gov

If you need help with your account or with your detector, please submit a HelpDesk report here:

<http://www.i2u2.org/elab/cosmic/teacher/forum/HelpDeskRequest.php>

If you choose to participate, you'll be randomly paired with other participating schools and invited to share data between your school and your partner school. It is encouraged that you allow students to ask questions of other students regarding the data. This could take place over email, chat, google hangout or another method of your choice. **A video meeting from Fermilab will be moderated the following week.**

If you can only participate for any part of the week or even a day, we still want you to submit your results.

Please be sure to set up your geometry file with the new configuration. Ask your mentor or an experienced teacher for assistance or use the life ring!

Part 2

To the participants of the fifth annual International Muon Week,

First of all, thanks for joining this event. We are glad you are here. Here are some updates and things to keep in mind for the upcoming week:

Make sure you are on the air and your CRMDs continue to collect data. Please check them every day to make sure nothing unexpected happens that would cause you to lose data.

It is not necessary to collect data for 100% of the week if that is not feasible. Some data is preferable to none. Use the following commands:

ST 2 5

SA 1 and

TL (for blessing) as well as WC 00 2F for three fold coincidence. Have the counters stacked directly on top of each other.

Please upload data daily, or close to daily. Letting the CRMD collect data all week without any uploading will result in a very large upload file by week's end.

Check out our google map (<http://rodshome.com/CosmicMap/CosmicMap.html>) and see the schools that have joined us. We are truly international! And this is a relatively small sampling of schools that have CRMDs.

Thanks again for being a part of this event, and we'll be in touch soon.

The following was included in the previous message:

To sign up for the event go here:

Contact form <http://rodshome.com/CosmicMap/Contact/contactform.php>

If you need a new CR e-Lab account, please submit here:

e-labs@fnal.gov

If you need help with your account or with your detector, please submit a HelpDesk report here:

<http://www.i2u2.org/elab/cosmic/teacher/forum/HelpDeskRequest.php>

sincerely,

the QuarkNet team

Part 3

To the participants of the third annual International Muon Week,

We are almost there. Please upload your data **by Monday, April 18th** at the latest. As schools upload their data and share flux plots, the plots will become visible on the google map. Then, participating schools will be paired up (this will be done by a QuarkNet staff member) and asked to compare data. This is meant to be a way to initiate school-to-school discussions. Show your students your own data and the data from other schools. What questions do they want to ask? What questions might you have for other schools?

Please complete your collection of flux data for the week of **April 11 to 15**. After uploading the data to the Cosmic Ray e-Lab (www.i2u2.org/elab/cosmic), run a flux analysis on the week's data and save the plot. Go to "View Plots" and open your saved flux plot; capture the URL and paste into the input box available at the link below.

Contact form <http://rodshome.com/CosmicMap/Contact/contactform.php>

Thanks again for taking part in this international effort!

The QuarkNet team

World Map of QuarkNet Cosmic Ray Detector Sites

The Cosmic Ray e-Lab provides an online environment in which students experience the excitement of scientific collaboration in this series of investigations into high-energy cosmic rays. Schools with cosmic ray detectors upload data to a "virtual data grid" portal where ALL the data resides. This approach allows students to analyze a much larger body of data and to share analysis code. Also, it allows schools that do not have cosmic ray detectors to participate in research by analyzing shared data.

Part 4

To the participants of the **2016** International Muon Week,

Thank you for taking part in this event and sharing your data.

You will now be paired up with another participating school. We ask that you and your students contact your partner school and discuss similarities and differences in your data sets from **April 11 to 15**. Please do so as soon as possible, as some schools are coming to the end of their school year.

Before you contact your partner school, view your data and your partner school's data with your students. What questions do the students want to ask? What questions might you have for your partner school? What different factors might affect the flux? What other conditions might be important to understand your data and the data from your partner school?

Please share these questions (and more like them) as you discuss the results of the International Muon Week. We hope you have gained some insight from this experience and return next year.

As always, you can find the google map at <http://rodshome.com/CosmicMap/CosmicMap.html> to locate your partner school.

Sincerely,

The QuarkNet team