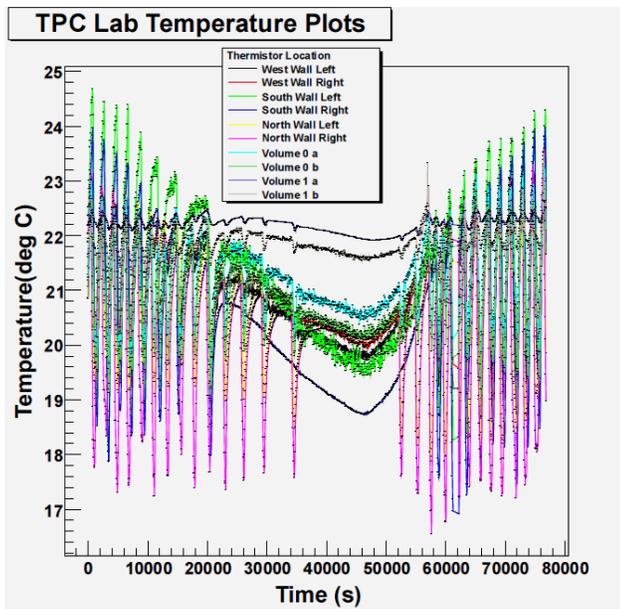


# DANGO

## (DOINGS AND GOINGS ON)

### UPDATES FROM THE STUDENTS



From Tyler Hague:

“Hey Dango,

This is kind of long because like the past several weeks, I forgot to write in again... I have been mostly been working on creating a website that dynamically creates slow control plots for offsite monitoring. This week I also was given the task of adding another page that will allow the user to view histograms of run data. It will allow you to choose which plots you want to view and which runs you want to view them from. This simply pulls images from storage, so it doesn't have to create the images like the slow control plots.

To do this, I have been learning to program in python. The web framework is a python package called django. It seems to work really nicely and be pretty simple to make it work how you want it to. I

also have been learning a bit of matplotlib, but most of the plotting code is written by a CalPoly student that showed up a couple of weeks ago who has a little bit of prior python experience. I have also started hooking up some pressure monitoring so that we can see how badly we are affected by the large temperature swings that we have been seeing. Despite our data, it does not seem like this will be fixed any time soon.

I have also sent in a plot of the temperature in the room. The plot is over 12 hours, and you can see the temperature swings are periodic over about 30 minutes. We get swings of about 5-7 degrees Celsius, except in a few hour window. This is at night when the air conditioners turn off (despite being assured that the system never turns off).

Have a great week!

Tyler Hague”

From Elizabeth Carlisle:

“Hey everyone,

This week I have mainly been dealing with computer stuff. We have a program that generates phonon images, so I've been reading the code and trying to understand how it works. I've been learning some fortran, since that's the language that it's written in. Other than that, much of my week was spent trying to install the program QtiPlot, which is used for data analysis. It was a little more difficult than I had expected. I managed to download the source code from the internet, and after spending several hours trying to get farther along in the installation process, I went to Shon for help; I didn't know exactly what I was doing. We spent two days trying to compile it, which is probably a lot longer than it should take. Finally, on Friday, right before I had to leave, we got it to work.

As for non work-related activities, Wednesday was the Fourth of July, so I went to Dr. Head's house, where we had a nice barbecue and

watched the fireworks. We all had a good time. Also, my cousin's birthday is this weekend. She'll be eight on Sunday, so I'm looking forward to stopping by to celebrate with the family. It should be fun.

–Elizabeth”

From Adam Simpson:

“Hello Dango!

It's been a long time since my last report. Our work has changed a lot since then! We finished taking all of the calibration data and have put it all into Origin for analysis. The only part of the analysis that has proven to be a challenge is fitting the focus data and finding the optimal focus. But I was using a formula from a random Dissertation and have yet to retry with the different formula from Dr. Head's.

We also were introduced to the program that is supposed to analyze an image and output the correct elastic constants of a crystal that would produce the image. The program has multiple parts to it. The first part differentiates and "digitizes" the image. By differentiating we can determine caustic lines, which are the sharp edges of contrast in an image, because these caustics occur at regions with a high change in amplitude. This avoids the problem of our program distinguishing between darker and lighter images, making our analysis more efficient and malleable. Then the program compares the image against randomly sampled, synthesized images, assigning some numerical "cost function" to define the similarity between the two images. The differentiating and comparison portions of the program are what may need tweaking or rethinking. But the programs are written in fortran... so I have to learn a bit of that before diving too deeply into it. We are planning on making a trip up to Texas Tech in a few weeks. So we will be writing up a procedure of what we plan to do so they will let us use their clean room. We need to do some photo lithography, which is why we need the clean room. We will then come back to Abilene and grow our thin metal films on the wafers we will prepare at Tech. I am discovering that this summer is going by way too quickly. I feel like there is far too much I want to do for just a summer's worth of work.

Hope you are all enjoying your research!

–Adam Simpson”

From Spenser Lynn:

“Hey DANGO! I hope everyone had a fantastic holiday and enjoyed welcoming the newest addition

to the particle zoo. Prior to the 4th, I spent most of my time working with Dana on the gas system and playing around with the slow controls which we could never get to work. Once Dana left for vacation on Tuesday, I switched back to glove box work and tracked down an ionizer for it. Friday was a very exciting day as I got to watch and take part in the disassembling of the TPC and the storage of the used plutonium target. Everything in that operation went smoothly and nothing became contaminated. I'll have pictures of the TPC and target next week, so get excited. The weekly concert at Ashley Pond is in store for tonight, and judging by the clock, the weekend is calling to me. Take care everyone!

–Spenser Lynn”

From Walker Nikolaus:

“This week consisted of making lists of useful information to be analyzed. The first task of the week was to link run numbers with high voltages with an end goal of seeing if the latter effects noise. Once that list was made we moved on to solving our air conditioning conundrum. One of the ac units in our tent was leaking as much hot air out the back as cold air out the front. By switching around some of the connectors we were able to pump most of the hot air outside the tent, making our lives much more pleasant. We then proceeded to take apart an RPC and finish connecting the gas tubing necessary to make it work. Wednesday was the fourth, we went to the beach and had a cookout. Another of the projects at the end of the week was making a master list from the lists we created that had all necessary information.

–Walker Nikolaus”

From Ryan Castillo:

“Dango,

It has been a Texas style week here at Fermilab with temperatures over 90 almost all day, every day. It makes for a great opportunity to enjoy the apartment's pool. Kyle, Noah, and I are going camping this week with the Naperville college kids. I'm told there will be canoes, s'mores, and ample opportunities for frolicking about. On Wednesday we ate and played board games at the Isenhower's son's in-laws' house and ended the evening by watching a fireworks show in downtown Batavia, which was mighty fine. As for workage, we've been learning about how to use the system for controlling the Hodoscope HV. Next, we are tasked with finding out why some of the scope are out of time.

# UPDATES FROM THE PROFESSORS

We officially began the process of wiring the new drift chamber on Monday, so we are taking shifts on that along with some of the other grad students. Happy Thursday!

Best,  
Ryan”

From Noah Kitts:

“Hey!

As an update on my health, I am a ton better than I was last week. All this past week we have been taking our shifts wiring the chamber and checking the tension on the wires. Doing this work is pretty repetitive and takes a lot of concentration so as not to forget what you're doing and mess up. It is cool to see the progression on the wire chamber, and I wish we could be there when it is finished. In news outside of work, we saw Spiderman in IMAX 3D on Thursday, and it was AMAZING! (No pun intended). Also, Independence Day on Wednesday was great.

–Noah Kitts”

“From Drew Boles:

Hey DANGO!

This week began work on the wire chamber. We have shifts of four hours for stringing the wires. It's only four hours because if you do too much more than that, you start to go a little insane. I only took one shift this week because my parents and brother came into town to visit. It was nice to take a little break and show them around the beautiful city of Chicago. However, it's back to the grind this week! Peace,  
Drew”

From Kyle Bowling:

“Hello Dango!

We began wiring this week on the new wire chamber and were really productive despite only having four days. By the end of the week we had around 250 wires completed. The procedure is quite primitive but it gets the job done and once you get the hang of it, one wire winds up taking approximately 2 minutes. Other than that we pretty well did nothing else productive and aren't expecting to do much else than wire the rest of the summer! Oh yah, Ryan, Noah, and I went on a camping trip with the college group at Naperville Church of Christ and that was a lot of fun!

It's been real Dango!

–Kyle Bowling”

From Dr. Michael Daugherty:

“Dear DANGO,

We finally have both air conditioners working in the factory, so the temperature is below 80 degrees for the first time in a long time. Regardless of anything else, it feels like a wonderful and productive week simply because we got the air conditioner replaced. The new model apparently has WiFi. I have no idea what that is about, but hopefully I'll have some time next week to configure our air conditioner's proxy settings (that sounds so weird) and run some nmap scans.

The 4th of July was wonderful. We relaxed with friends and family, grilled, and I had two really, really good games of DotA, so I couldn't ask for anything more. I'm attaching a picture of the blazing inferno that is Rusty's grill. This weekend we're braving the heat to have some adventures in New York City. This is our last weekend here before heading off to Chicago.

Finally, I've been working on some ACU press releases and PR stuff regarding our World Record and the Higgs discovery announcement. I'm curious to see where all this goes.

–Dr. D”



From Dr. Rusty Towell:

“Hello Dango,

I hope you took some time to celebrate our countries birthday this week and reflect on the blessings of freedom and liberty we share. We made a trip to the beach, grilled hamburgers, relaxed, and played games. I could get used to having a day off in the middle of every week.

At work we've continued to move forward on the two main areas we are working on: the analysis of the RPC data from run 12 and the recommissioning of the cosmic stand. Additionally we spent some time repairing a proto-type RPC that we might bring back to ACU and cleanup of the RPC factory. I spent some time in the RHIC tunnel looking at the gaps in the improved shielding around the RPCs. Lots of time, energy, and money have been spent to reduce the unwanted hits in the RPCs from the beam halo. However there are still a few gaps that we think we can fix by building a small wall of bricks under the beam line. (See attached picture that includes ACU alumni Daniel Jumper.)

Finally, I've agreed to serve on the Internal Review Committee for a PHENIX publication that we hope to publish before the big conference called Quark Matter that is scheduled for the second week in August. That should help to keep me busy for the next month.

Grace and Peace,

Rusty”



From Dr. Donald Isenhower:

“Dear DANGO,

This past week has seen the really beginning of the wiring of the new station 3 wire chamber. The students hopefully will tell you that they are now on shifts alternating between stretching wires and measuring the tension of the wires, which they must then replace if they are not correct. If you didn't catch my comment on the phone conference, here is a little calculation for you. This chamber is being strung with 30 and 80 micron wires for the most part. Just take an average of 100 gram-force on each wire, divide it by your weight (in proper units of course) and you can find how many hairs your professors need to hang you from the ceiling. Then consider 5,000 wires, and you will find an amazing number. The actual average force per wire is more, so the number you get is smaller than the actual force on the edges of the chamber.

I have tested the PMT/bases to be used for the new beam monitor, which is aimed at what is called a SWIC, that a small fraction of the beam interacts with. Since the beam will be  $2 \times 10^{12}$  per second, the intensity is high enough that nothing can be put in front of it. To compare to PHENIX, take 100 times as much beam that is stored during a 4-8 hour run, and dump that amount every second into a target and beam dump were every particle interacts. This makes the radiation in the target area at the lethal region in a few seconds (this beam would be a radiation source about 100,000,000 times that of the sources you use in Modern lab.

My main job is to have tasks for the students not on shift to work on while I work on my own tasks. Everything must be done in the pit as our air conditioners have all failed. On Thursday and Friday the inside temperature climbed to the 99-degree range, so all work in the area is forbidden. Next week I am going to be trying again to get the students here to get a lesson in how to run a diamond-milling machine to make scintillators. I also started getting more serious on my plans when I leave to go to work on NIFFTE in August. I should arrive on the 2nd and the run should start on the 8th, so I have a week to get my tasks done and check out what Spenser and others have done on the slow controls. The summer work for most of you is heading towards a close soon, so keep on making everybody wish THEY had some ACU students of their own.

–Dr. I.”

## IN OTHER NEWS...

SPS Congress is coming up! If you haven't already, contact Dr. Head at [tlh07b@acu.edu](mailto:tlh07b@acu.edu) as soon as possible if you are interested in going!



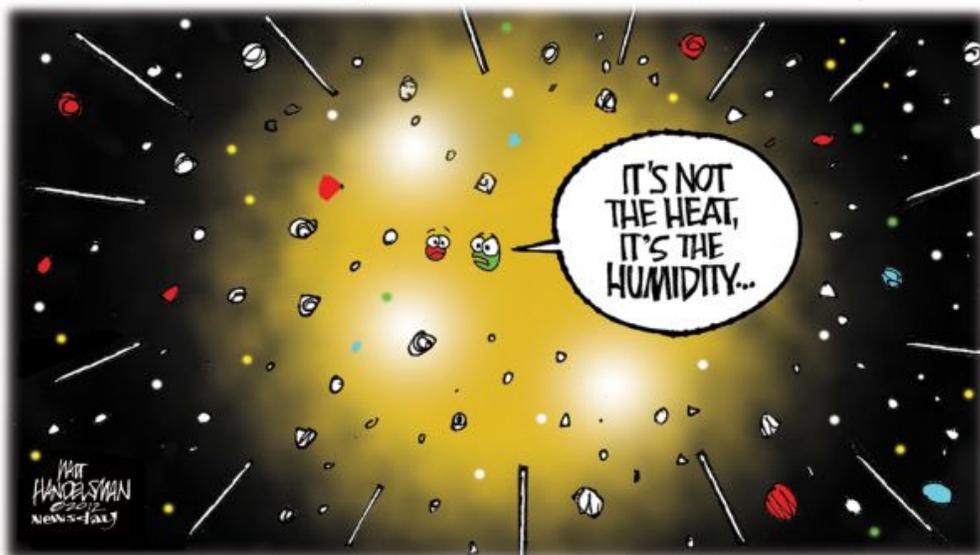
### 2012 Quadrennial Physics Congress

- Date – November 8-10
- Location – Caribe Royale Hotel, Orlando, Florida & **NASA'S KENNEDY SPACE CENTER!!!**
- For further information visit [spscongress.org](http://spscongress.org).

Once every four years Sigma Pi Sigma, the physics honor society, hosts a unique meeting that brings together undergraduate and graduate physics students, practicing physicists, and physics alumni for a weekend of cutting edge science and reflection on the role of the scientist in society. The Quadrennial Physics Congress (PhysCon) is unlike any other physics meeting, combining round-table discussions, distinguished speakers, and laboratory tours with poster sessions and celebrations of art and science.

The 2008 Congress was an energetic, inspiring meeting of more than 600 physics students, faculty, and alumni at Fermi National Accelerator Laboratory in Batavia, IL. The 2012 PhysCon will build on the energy and enthusiasm of the 2008 Congress with an anticipated 80 participants exploring the theme Connecting Worlds Through Science and Service in Orlando, FL, near the home of the Kennedy Space Center. Be part of the action in 2012 – make plans now to attend PhysCon!

INSIDE THE RECORD-SETTING 7.2 TRILLION-DEGREE COLLISION  
CREATED AT BROOKHAVEN NATIONAL LAB...



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