

DANGO (Doings and Goings On)

Winner of last week's Photo of the Week Contest

"The ceiling can't hold us!" –Ramsey Towell



been able to get work done despite being somewhat immobile. The Isenhowers left wednesday leaving us to fend for ourselves for dinner. We made a ton of clip lines this week for stations 3 and 4 hodoscopes.

–Noah Kitts

FROM ELIZABETH CARLISLE:

Hi everyone,

This has been a fairly uneventful week. Dr. Isenhower has gone on vacation, which means that we have been left to figure out what to do at work ourselves. It also means that we have been on our own for dinner, and I don't think anyone feels like cooking. So there hasn't really been anything exciting going on, as I tend to not do much after getting done with work. But we did go back to tango club on Thursday, which was fun because there were more people this week. Also, swarms of lightning bugs have descended on Illinois, so I've been trying to get use to seeing random flashes of light when I'm out at night.

–Elizabeth

Updates from the Students



FROM NOAH KITTS:

Hey guys!

This week has been interesting. I am a week into my recovery from my broken leg, and it's definitely really inconvenient for both my work and my everyday life outside of work. However, I have still

FROM KYLE BOWLING:

This week was a pretty productive week. We finished adjusting the voltages of the station 3 and 4 hodoscopes as well as manufactured and applied all of the clip lines that we had materials for. Me, Lacey, and Elizabeth were also introduced to the data acquisition system and how to work the program that runs it all. We have also made significant progress in clearing out eligible data tapes from the crates in storage. I am looking forward to the upcoming week of work!

–Kyle Bowling

FROM LACEY MEDLOCK:

Hi,

This week Dr. I and Cindy weren't here. We made lots of clip lines. And by lots I mean 103. And then we put all of them onto the hodoscopes. We ran out of them before we ran out of hodoscopes, so we're going to have to make more.

Have a good week,

Lacey

FROM RYAN CASTILLO:

Hello DANGO,

This has been an exceptionally productive week for me. I have gotten so very much work done on my HV controller program! I get to start a new project soon, which will eventually be merged with my HV controller. The new project is to write a program which communicates with our Level Shifter Boards associated with our Amplifier Shaper Discriminator Integrator (ASDQ) cards which are used to read out signals from our drift chambers. This project will be very similar to my current one, because both the LeCroy High Voltage crate and the Lever Shifter Boards communicate via Telnet.

I am sad that the Isenhawers are gone this week, because I am very hungry. It's ok though, because now we have an excuse to go to Giordano's. It's finally getting warmer out here (about 75°). I was getting tired of the cold rainy mornings, especially after enduring Germany's longest and coldest winter in 150 years. Hopefully the nice weather (and crummy internet) will encourage me to get outside and do jumping jacks or something. If not, I'd love to play league with my fun physics friends. My name is Werhliburhd. Don't be discouraged from playing with us because of Kyle, I'll make him play jungle Annie or something.

Best,

Ryan



FROM ERIK FORRISTER:

Dearest DANGO,

I am happy to inform you that my project (to move the lens without hands) is now operational. Sleep mode didn't turn out to work that well, so instead I wrote the program to go through an infinite loop to blink LEDs while it waits for a command. The program will now take in the amount of steps after it reaches the zero point. It will go that number of steps (clockwise) and wait for the next command (back to zero or clockwise more steps). I think the next step is to solder it together in a nice box with long wires for the movement of the motor. Then I'll be testing the distance and maybe refining the program some. Eventually, I will need to somehow integrate a digital micrometer into the system to insure accuracy.

Best regards,

Erik Forrister

P.S. Fun fact about my project: It took over 120 lines of code to input 2 numbers. So, be thankful for higher-level languages.

FROM FRANCISCO TERAN:

Hello Dango,

This week has been full of new challenges. As soon as we are done writing a C# program for the USB and the mirrors a new challenge appears. This week we work on a C# program that will make the mirrors move faster. We were able to write this code using loops. After that we began working on finding the right buff size for the USB. Also, we set new values for the resolution, the scan rate, and the output channels. During the past two days we worked on finding a way to make the USB stop after running through a full scan. It took us a long time to figure it out. Today I started working on defining the start point of the scan. Next week we will be working on finding a way to

trigger from an external point and finding a way to look at a single point of the data. Also, we will be looking for a way to call the C# program from Java. I have really enjoyed learning how to use C#. It is a very complex way of programing.

–Francisco Teran



FROM SPENSER LYNN:

Hi DANGO,

This has been a productive week for us as we completed soldering the wires in the first layer of the drift chamber prototype. We started working on testing the tension of the wires with the method used by the guys at Fermi last summer, but haven't gotten things working right yet. We located a more precise function generator and IhnJea is getting us a better magnet so hopefully we can get some accurate measurements on Monday. We got to hear a couple interesting talks on neutrinos and the physics of baseballs which were both great. Normally, watching baseball is painfully boring (no love for the Rangers here), but when you watch footage filmed with a high speed camera in order to understand the physics, things get more interesting. I've submitted my suggestion for incorporating analysis like this to the MLB, but I don't expect it to get very far. James, Chris, and I tried going a jazz concert on Wednesday night, but that unfortunately wasn't very entertaining. To compensate for this social-outing failure, we went to listen to Kristin and the UIUC summer band on Thursday night and followed up the concert with Cold Stone and swing dancing. Overall, it was a good week.

–Spenser

FROM KRISTIN HOLZ:

Hello!

This week I finally got my graphene loudspeaker simulation to compute and create plots of electric potential and stress on the graphene membrane.

However, it is just a skeleton of what the speaker should actually be. Now I'm working to cut down the geometry to one quarter of the speaker so that the program takes less time solving the system before I add more conditions.

On my clarinet, I ran a couple resonance spectrum analyses where we precariously clamped my clarinet upside-down and attached some piezoelectric transducers to the bell to measure which frequencies caused my clarinet to vibrate longitudinally the most. There are two ranges where the clarinet resonates, and this explains some weird harmonics in those ranges observed in the impedance data gathered previously. We also started measuring the pressure and particle velocity along the bore of my clarinet for F4 on the tempered scale to observe the standing waves inside the instrument.

On Thursday I performed in the first summer band concert of the season which was outside in the Quad on a perfect day. It went really well even though we only had three weeks of practice to prepare for it. I went swing dancing again and this time Chris, James, and Spenser joined me. It was a lot of fun. But I must say, Elizabeth and Lacey, I'm super jealous of your tango club. =)

On Saturday, the REU interns went to Fermilab for a tour of the underground MINOS and MINERVA experiments as well as the CDF experiment which is no longer running. It was a long day, but really awesome! And the grad student giving us the underground tour will be working on SeaQuest in the near future. Unfortunately, I didn't have time to see everyone at Fermilab this time, but I hope to sometime this summer.

–Kristin Holz

FROM CHRIS CAMPBELL:

Hi everyone,

Well our second week in "Chambana" went pretty well. As expected, we started soldering the sense and field wires onto Prototype B. Most of our time was dedicated to soldering and building the PTB cathode sheets. We finished soldering one of the

two wire planes, so we'll probably be starting on the next plane of wires soon.

Now that we have a complete wire plane, we have begun work on trying to determine the current tension acting on the wires, *after* they've been soldered. We're doing this using the same method from the E906 SeaQuest experiment at Fermilab last summer, which exploits the relationship between the wire's tension and its resonant frequency. We're planning on getting some useful measurements from this in the upcoming week. Also, we're starting work on the cosmic test stand, and designing a stand on which to mount the drift chamber below the cosmic stand for testing.

REU talks this week were rather interesting. The first was an overview of the physics of baseball (If anyone wants to read more about this, it's pretty cool: baseball.physics.illinois.edu), and the second was on neutrinos.

–Chris Campbell



FROM RAMSEY TOWELL:

Salutations DANGO,

This past week has been rather busy. We started off most mornings working in the factory, cleaning up the tent and wrapping up and organizing high voltage cables. Then we would find an empty conference room to work on our various coding tasks until some meeting began to take place in our room so then we would search for another empty room and then the process would start all over again. We are moving forward with a pretty upbeat rate because now we have like 5 different tasks to jump between to keep us busy. My dad will be gone again next week to go to the June Passport so once again the men of BNL will take on the momentous task of pushing back the tides of knowledge, alone.

So my birthday was last weekend and I am now 20. We also saw Man of Steel which was pretty cool. Still not as cool as Batman but he was alright. We also plan on going into the city maybe next weekend but there has been no further planning other than deciding we are going to the city.

We got to go see the G-2 magnet on the truck all prepped and ready for travel tomorrow morning so soon the fellowship of movers will begin their perilous journey of bearing the ring to Fermi. I personally am willing to bet that this task will claim the ring's life because it's not allowed to bend more than 3mm and they are taking a ridiculous path to get there.

Bonjour,
Ramsey

FROM RYAN PINSON:

Hello DANGO,

This week we had the Forward Upgrade meeting early Monday morning followed by more programming and more factory work. In the factory this week we have been organizing HV and signal cables from the previous RPC setup in a rack. Also we have been organizing excess copper and more LIMO cables as well as other odds and end. In programming we have been adding a few new parts. We now have a list of runs that we have to make several graphs of the trigger rates relative to the BBC count. Next week we are stating to look at using the efficiencies calculated for the RPC. We went and saw the G -2 magnet again, which is now at the entrance of BNL ready to leave.

This week we starting play ultimate with a group at BNL and as always made sure to play a little League.

Adios,
Ryan Pinson

FROM ANDREW MILLER:

Hi DANGO,

This week we've done a lot of work! We started off the week by repairing Ryan's laptop. His power jack was broken so his computer wouldn't charge.

He ordered a replacement, so with the help of four people and two soldering irons, we eventually managed to replace one small piece. We also did a good amount of work in the factory removing a lot of high voltage and signal cables that were hooked up to the hodoscopes that used to be there. It is a lot cleaner looking now, but we may need to put back quite a few of those cables because there is going to be a new set of hodoscopes in the testing rack soon. Our programming work is also progressing well. We have made several very pretty graphs in root that show the rejection power of several different triggers versus the overall beam intensity. This uses about 4 different programs and scripts that we have written, and it uses them to make these plots automatically. Although these plots aren't our final goal, they use most of the data we will need, so it is just a matter of deciding what time frames we want to plot, and which numbers. On Wednesday we heard an excellent talk about nuclear physics detectors and then had a tour of part of PHENIX now that the wall is being taken down.

Next week Dr. Towell will be leaving us, but the User's Meeting is next week, so we will have plenty of talks to keep us busy in addition to our regular work. We have several upcoming jobs helping with various hardware tasks also, but we can't start either until some parts arrive.

In other news, there were some fun games of Ultimate last week, and we saw Man of Steel last weekend. I really liked it, and thought it was better than any other Superman movie I've seen.

I hope you all have a great week,
Andrew



FROM ADAM SIMPSON:

Hey DANGO!

I forgot to write last week. So this will be two weeks worth of developments. Not much has changed. Dr. Carr was traveling for conferences

for about two weeks. He only got back this past Wednesday. So I have been working on my own and with the other students. I'm still tackling the solitons. I am trying to get a feel for how a gravitational-self potential energy term might change the soliton solution in a measurable way. We did a rough estimate yesterday of the numbers that we might expect to determine if we can test our equations on a Bose-Einstein condensate, but as of yesterday we need to somehow find 23 orders of magnitude... Interestingly, if we account for these orders of magnitude by the number of atoms in the system, we find ourselves roughly at Avogadro's number. There's no escaping it, classical gravity really can't be directly detected below the classical regime. But hopefully the solitons will show an indirect effect and we can look for those effects, rather than try to directly measure. But for a while we need to plunge back into literature.

The room I work in has white boards on every wall, six different forms of coffee maker, and about forty famous physicists and mathematicians on the walls looking down on us in disappointment. It is the perfect "lab" for a theoretician. There are also tons of good books on applied math and physics. Sometimes I get distracted and just read. It's great fun. I also have been letting my math research distract me. I finally got a number derivative program written for the integers, quotients, and Gaussian integers. I am only limited right now by the size of my data type. I have made several plots, some of which look like the results of a particle accelerator, just a bit more linear.

I am deeply enjoying Denver! I went to a concert at Red Rocks that was incredible. And I went to Boulder last week and checked out the CU physics building. It is the tallest building on campus and the whole 12th floor is one room with windows and blackboards galore. I could have sat up there all day. I think we need to lobby for a floor like that in the new science building. Other than that I've just been hanging out with my family, going to see movies, and working. Hope you're

all enjoying yourselves!
Peace,
Adam

Updates from the Professors

FROM DR. DONALD ISENHOWER:

Hello all,
Well I spent Sunday-Wednesday working on various tasks and making sure the FNAL students had jobs to do while I am gone for a week for vacation. I try to take one every several years. I took one 9 years ago and 2 years ago, so Cindy has told me that I must take another one. For some reason when I point out that we took a few extra days here or there on the way to or from a lab she won't count them as vacations! All of this shows you why it is important to find a spouse who has better sense than you do. I am up near Green Bay, WI where it is nice to be away from work issues.

Before I left on Wednesday I had determined based on the work on the students and other things I have done that all of the stations 3 and 4 hodoscopes needed to be lowered by 150 Volts (200 V if the students weren't installing 224 clip lines that will drop the pulse height to 0.63 of its original size. This could be the source for a electronics prize for non-FNAL students. Why does installing a twisted pair wire of 100 Ohm put on one end of a "T" connection drop the pulse seen on the other, hooked up to a 50 Ohm cable, to about 60% of its original pulse height? I think that with the help of some collaborators I now have CEU topics for each of the students. Some were already known when they came, but except for the project assigned to Ryan, didn't have a specific student matched up to them. When I return on Wednesday, I expect that the ten or so things I left for the students to do will be completed. Of course we also get to make clip lines for all of the station 1 and 2 hodoscopes, but will be using 122 Ohm cable (for those who figured the first question out, calculate this one to see the advantage). ACU is

in its standard mode of helping everywhere on the experiment. The good news is that the new beam pipe going in about on schedule. There was maybe a week lost recently, but they have contingencies in the work plan, so we should still get beam by some time in August.

Everybody take care, and as Dr. Paul Reimer is always reminding SeaQuesters, work safely!

–Dr. I.

FROM DR. RUSTY TOWELL:

Hello Dango,
This week we got busy cleaning up the old RPC Factory tent. It's a bit sad to take apart a factory that ACU helped build so many years ago and that has worked so well. But PHENIX has to give up the space, so it's time to return equipment and clean it up. We've pulled and organized lots of cables of all different kinds, returned equipment to the local equipment pool, recycled Cu and Al, disassembled a prototype RPC, carried off trash, ... After spending the morning in the tent, we'd spend the afternoon on our RPC efficiency studies. We can now generate lists of good runs and soon will be calculating the RPC efficiencies for these runs versus the beam intensity. We've also been asked by Mickey to help with his multi-gap RPC prototype test stand and by the VTX group to help repair the VTX.

Next week I'll be welcoming new students to ACU during the June Passport. It looks like there are lots of great students coming this fall.

Grace and Peace,
Rusty

FROM SHON WATSON:

Dear DANGO,
I continued to work on the Nifite TPC data acquisition software this week. I have spent a lot of time trying to find a good way to measure the software's latency and responsiveness. I started histogramming the difference between data and acknowledgment frames when running my test programs. I hope to make software changes to im-

prove this distribution of latencies. Unfortunately, I did not get a chance to test the most recent software updates with the actual EtherDAQ cards yet.

–Shon

FROM DR. MICHAEL DAUGHERITY:

DANGO,

It is sad to think that between PHENIX shifts, the DOE review, and this education workshop in Portland that I’ve only managed a few days in Chambana, my new favorite contraction for Champaign and Urbana (the city boundary runs literally through the middle of the university). In that time we’ve made significant progress in building prototype B which we hope to finish and test before the end of summer.

My biggest work-related moment of the week came in a meeting about the details of the prototype. We were discussing the wire tension, but no one here knew of a good way to test the tension after the wires had been soldered. I remembered that we had clever method for this at Fermilab last year but I wasn’t sure of all the details, so I asked for help from last year’s SeaQuesters. After being told by lots of people that the method was never documented very well, we eventually scrounged together enough to get started. There are two lessons here: 1) always pay attention to other people’s work and ask lots of questions, and 2) for the love, take good notes of everything.

My biggest non-work-related moment of the week came in finally getting to cross the world famous Voodoo Doughnuts off my bucket list. My favorites are the bacon maple bar and the memphis mafia (a banana fritter with peanut butter, chocolate, and marshmallows). By the way, they do legally-binding weddings with packages including a doughnut centerpiece and doughnut cakes. Say “I Do” to doughnuts.

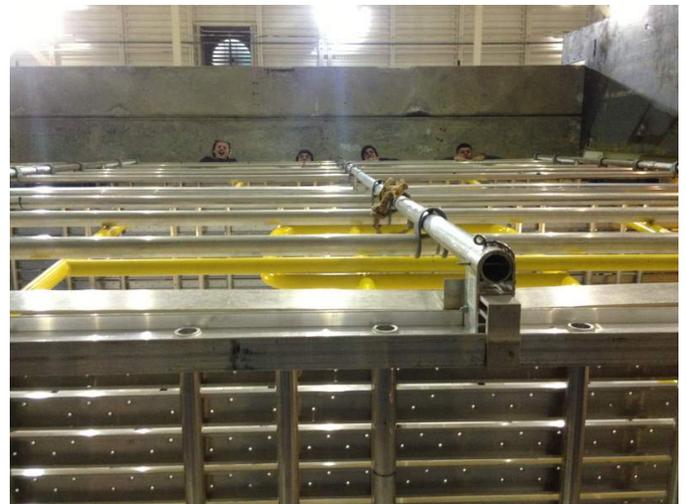
–Dr. D

Photo of the Week Candidates



#1: “Voodoo Doughnuts. I am including a picture just to make you all jealous.”

–Dr. Michael Daugherty



#2: “The BNL Guys looking down from the top of PHENIX.” –Dr. Rusty Towell



#3: “Some encouragement for everyone =)
(found at Fermilab).” –Kristin Holz

Other News

25 Years of Cookies

Lois Marie has served our department for 25 years. Please take a minute to estimate how many cookies she has lovingly baked for us then drop her an email and tell her how much you appreciate her.

New Students

The department of Engineering and Physics expects to welcome over 60 new students this fall. This will be by far the largest group of new students ever for our department and three times the number of engineering students as expected. Plan now to help us welcome them to our department.

Fall conference

2013 Fall Meeting of the APS Division of Nuclear Physics October 23-26, 2013 Newport News, VA.
<http://www.aps.org/meetings/meeting.cfm?name=DNP13>

New alias for our department:

acu.edu/engineering-physics

Snowmass Young Physicist Survey

Help shape the future of High Energy and Particle Physics research: <http://snowmassyoung.hep.net/>