ACU Physics Research Weekly Newsletter

Volume 17, Issue 3
June 26, 2011

DANGO (DOINGS AND GOINGS ON)

Updates from the Students

From Erik Ringle:

Finally, the drudgery that characterized the first few weeks here at LANL is disappearing; training is winding down, computer software is compiled, and projects are ramping up. Dr. Towell has been here since Wednesday and we have been discussing some specifics on the slow control system. We will be focusing on the high voltage systems as well as thermistor monitoring and control to start. This will involve writing code and interfacing it with the Midas control system. Previously, our work computers, running on an older version of RedHat Linux, were plagued with errors when attempting to compile project software, however, with the help of Dr. Qu, we were able to compile, and successfully test (using emulators) them. Looking forward, I can see that we will have our work cut out for us, which is exciting.

On Friday, we went on a tour of the LANSCE complex, visiting the LUJAN center, the Cockroft-Walton generator which is involved with Proton injection, and the medical isotope production facility. This was very interesting and impressive.

All the best,
Erik Ringle

From Ryan Castillo:

Hello,

This week I've advanced my knowledge of C++ and finally managed to get all the NIFFTE software installed on my computer. Erik and I can finally start our main project for the summer which is to further develop the TPC slow controls. Today I went on a tour of the accelerator facilities here at LANL where I learned a little about several different experiments. The best part is I got to play with the manipulators in a hot box that is used to make medical isotopes. For fun I have been cliff diving, kayaking, and playing board games. A few minutes after writing this Erik and I are taking off into the Jemez mountains, west of Los Alamos, to spend the weekend at the San Antonio hot springs!

It's going to be good.
Ryan

Ryan sitting on the beam line

On the way to jump off cliffs

From Sarvagya Sharma:

Dear Dango,

This week I've been preparing for the ANS meet next week. I've been making plots, figures and illustrations. Also, I have been analyzing the output from other reconstruction modules for the NIFFTE TPC.

Other than work, I've been hiking around with Tyler and Holly around the trails in Pocatello. Last Saturday we made it up 'Kinport peak'. Holly took some interesting pictures which she might post up here.

Sarvagya

Sarvagya, Tyler, and Holly on Kinport Peak

Sarvagya and Tyler crossing a snow drift on the trail down Kinport Peak

From Tyler Thornton:

Dear Dango,

This week I have continued to work on the analysis for calculating the spread of a track in Z. After an angle by angle comparison we agreed that fission fragments and alphas are about the same, I wanted to be able to compare all alphas to all fission fragments, which means an absolute width needs to be calculated.

Shon suggested calculating the width perpendicular to the track, would be interesting to see, so I started there. For the most part, it looks like each track's perpendicular spread is about the same along the track. Mike Heffner wanted to see how the spread of the track in Z changes as a function of the polar angle. I made those plots and they did not seem quit right, so I changed to plot to be with respect to the cosine of the polar angle and instead of getting a linear line (as hypothesized) it almost looks like a 1/x function. Looking at simulated data, the same pattern occurs in both the z and perpendicular spreads.

While in real data the cosine of the polar angle vs. perpendicular spread is almost a vertical line, this is possibly due to the limited active region in the TPC. I am still working on what the shape of the means. I also started to try to calculate the width of the track in the x-y plane, this is needed later to calculate the diffusion of the electrons, and compare the the diffusion parameters given by MAGBOLTZ and implemented in the TPC Diffusion module.

I also worked on getting the newest version of the NIFFTE simulations to work on Geant4 9.3, but am getting a segmentation fault with the new low energy libraries and have not yet figured this out. I sent Shon a patch file and am waiting back to see if he is having the same problems.

Lastly, I have been working on my ANS talk that I will be giving on Tuesday. By the time you are reading this, Sarvagya and I will be in Hollywood, Florida for the ANS summer meeting.

Till next time,

Remington Tyler Thornton

From Holly Thornton:

Hello all!

This has been a very busy week. The engineering department at ISU has recently purchased “the Ballard building” about two miles up the mountain from the campus, now the Idaho Joint Research Complex. This 'new' building has actually been sitting empty for five years and has a rather incomplete blueprint. So a few other students and myself spent Monday continuing to fill out the blue prints, and I joined the cleaning crews on Tuesday and Wednesday trying to get the building in livable conditions again. Let's just say I have a new appreciation for all of the hard working men and women who are janitors. Thank them when you see them! The rest of my week has been a combination of moving equipment up to the new building and gathering quotes on clean room equipment.

On a fun note, last Saturday, Tyler, Sarvagya and I took a six hour hike up a nearby mountain, Kinport Peak. We took a different route down the mountain then the one we took up and ran into a huge snow drift that covered about 100 yards of the trail and on

both sides. That was not very fun to try getting across. It was a fun trip but difficult; I spent the next couple days accompanied by sore muscles.

Well, I'm glad to hear that everyone is well. Hear from you next week!

-Holly

The 'new' Idaho Joint Research Complex

PHENIX

From Ramsey Towell:

Hello Dango,

Well we had a lot of really boring talks this week. Didn't really understand much of it, but on the bright side, they had muffins at the talks. Also I found out that I'm a beast at soldering. I haven't messed up any more cards since my first one so I'm on a roll. Today there was the End-of-Run party at PHENIX so we got some really good burgers and chicken for lunch today so today wasn't too bad. I'm looking forward to sleeping in and the weekend though.

Adios,

Ramsey

From Dasith de Silva:

Well, I realized that everyone opens their entry with "Dear Dango" so I thought I should be a bit more conformist once in a while. Apparently I am not well versed at writing journal entries, maybe because I haven't done that in fifteen years. I was seven the last time I tried my hand at it. So here goes:

Dear Dango (I know that this isn't really the beginning of the entry but lets not get lost in technicalities),

I had an awesome week last week. It was spent running back and forth between work and Physics talks. The RHIC user meeting was in full flow which meant that there was plenty of food and coffee outside the seminar hall. I may sound a bit preoccupied with food but hey, that's one of the base needs of human beings so don't judge! But I did enjoy some of the talks. Dr. D was around to answer questions which was helpful. I also found out why people think theorists are self-involved. Apparently they just get lost in themselves which is alright as long as you aren't explaining something to me.

Apart from that work was fine. I am looking forward to this coming week to do a few new tasks. Other than that I got to spend the weekend in the city. It was the first time I rode a train in the U.S. and I thought the experience was excellent. I got to hangout with a Sri Lankan family and met quite a few people from the same neck of the woods. The city really felt like back home. Crowded, with a lot of bad, bad drivers. I sure do miss that back in Abilene. Other than that playing with two kids, a seven year old and an eight year old, was pretty fun. They are like little balls of concentrated energy. All in all, the week was a blast. Now for another one!

Dasith.

From Walker Nikolaus:

Hey youse guys,

So I have the worst luck with Settlers of Catan, but I did win my first game of Dota. So that means that I am 100% victorious.

As far as work goes, just more stripping, tip stripping, though it looks like we are about to get into some different types of jobs to make the different components of our detector.

Word Up,

Walker.

SeaQuest E906

From Andrew Miller:

Greetings everyone,

This week has been quite different, since the Isenhowers are now in New Zealand. We have had a wider variety of things to do this week than we have in the past. We were originally planning to start gain matching the hodoscopes this week, but we ran into some technical issues with our computer interface

for the hodoscopes, so it looks like we will have to postpone that job for a short time. We did learn how to use the scripts to monitor and adjust the high voltage, so that was fun.

While we wait on that job, we've been helping try to eliminate some noise issues in the ribbon cables for the drift chambers. They're currently testing various solutions and seeing whether or not they work. The latest idea was to try and space the cables out a little bit more, so we wired up a chamber normally, then took it all off, layered foam in between the ribbon cables, and then ran all the cables again. It looks like it helped a little, but they're still deciding if they're going to try to do that to every cable or not.

Yesterday, after hearing a talk at Argonne, Brandon, Tyler, and I helped try the latest proposed solution for getting something through our leaky beam pipe. We stayed at one end with a fan, while the people in charge went to the other end of the pipe and let a long plastic tube get sucked through the pipe. Then we switched to a shop-vac and continued pulling the plastic bag through. After about 600 feet, the bag got caught on the last place where the pipe changes in diameter, and apparently popped. It only has a little bit further to go though, so hopefully they'll be able to grab it from our end now.

Since the Isenhowers are gone, we've had to come up with our own dinners. We've decided to each make dinner one night of the week, which works well since there are five of us. So far they have all been good, and no one's starving yet.

Until next time,

Andrew Miller

ECL Ribbon cables wrapped in foam in an effort to reduce noise

From Brandon Bowen:

Dear Dango,

This week has been quite unlike last week. Last week everything went smoothly and worked fine. This week, however, nearly everything is going wrong. Our eMorpho multichannel analyser FPGA is not functioning correctly. When showing the events recorded in counts vs. channel (charge), the first 500 channels of the root graph display a mixture of positive and negative counts, which is not good. There have been other things that haven't gone smoothly but we are pressing through them after a little extra work. We began today using the Keithley digital multimeter Mandi and I put on the local network to monitor the 240V AC power to one of the stations high voltage power supplies to test whether or not the power failing momentarily or not. We also had a fun college devo/get-together on Tuesday night with everyone at Naperville.

Have a great next week,

Brandon Bowen

From Mandi Crowder:

Hey Everyone!

This week we tried to start the task Dr. Isenhower gave us for the three weeks he is gone. The task is to optimize the gains for the PMTs. To do this we will look for a distinction between signal and noise on the oscilloscope and look at each PMT’s Compton edge using the eMorpho. The oscilloscope worked fine; however, our eMorpho is having problems, so our task has come to a halt for now.

Even though we can’t mess with our PMTs, we have still had work. We have been helping some of our collaborators with a noise problem. ECL Ribbon cables connected to ASDQ cards have shown oscillations so large because of superposition that we can’t discriminate them away. To get rid of the oscillations we have tested if bundling the cables with foam in-between, making the cables shorter, and attaching ferrites would help. Some of these helped, but only when the cables are within a certain orientation, so really it is all very picky. Thus, the testing and searching continues!

Wednesday, we all went to a talk at Argonne and the speaker was great. After that, we came back to Fermi and split up. The boys helped suck the tube that will line a section of beam pipe in hopes to fix the leak problem. The girls attached faces to level adapter boards. We have done more cable organiz-

ing, set up kerberows, and will soon build a fuse box that will allow us to safely test the HV power for any drops.

With the Isenhowers gone, we've been in charge of supplying dinners for ourselves. So far, we have had wonderful meals (each night one of us out of the five cooks). Hopefully soon the weather will get nice, warm, and sunny so we can reunite with our pool. I hope everyone and their experiments are doing well!

Have a great day!

Mandi

From Kristin Holtz:

Hi everyone!

This week we put up some plastic shields on the hodoscopes to protect them from potential damage with people walking by them. We just need to put some warning tape on them so they are easily visible. We also bundled several sets of ribbon cable with layers of foam in between each cable for the wire chambers. We did this to help reduce noise in the signal and it seemed to help a little bit. Additionally, Mandi and I finished up attaching front panels to the last of the level shifter circuit boards. There is still some testing and re-soldering to do on the boards before they're ready to be up and running, but they are coming along pretty well.

On Monday, four of us participated in the blood drive that went on at Fermi lab and now I can say that I've donated blood for the first time! On Wednesday we went to Argonne in the morning to listen to some talks. We plan on going again next week to listen to J. Murray Gibson talk about science and religion. I'm really excited to see what he has to say.

Apart from work, I can say that I've enjoyed our dinner system that we've worked out. With Mrs. I gone to New Zealand, each of us cooks dinner on one day of the week and it's been really fun and delicious.

That's all for now. I hope everyone has an awesome weekend!

-Kristin Holz

From Tyler Hague:

Hello Dango,

We have survived one week so far without Mrs. Isenhower cooking for us. We began trading nights cooking so that we could eat.

This week I have been optimizing code, adding various helpful things to the code, and going to meetings. I am working to make SQL queries run as fast as we can so that the reconstruction code will be efficient. So far I've cut out about 30% of the total time. I think Monday I should get another 10% off or so. I have also added a diagnostic tool when running in verbose mode that uses the EXPLAIN command in SQL to show how queries are being executed. I also wrote a spiffy (9 lines! I'm proud of it being so small) little code that finds all SELECT statements in the query and adds SQL_NO_CACHE after it, so that we get realistic run times and can better see how different queries are running compared to each other.

I have had a talk or meeting at Argonne every morning since Wednesday, but they were interesting so that was good. Anyway, tonight is my night to cook dinner so I need to go get on that (we're having spaghetti!).

Until next week,

Tyler

Other Projects

From Daniel Pamplin (intern at Ball Aerospace in Boulder, Colorado):

Dear Dango,

This week has been a rush. Dr. Acton has completed work that was due by Monday, and because that deadline has passed he now has more time to spend working with me. This is a mixed blessing. It means that I get to learn more, but it is often difficult to keep up.

One of the neat things though was on Thursday I collected data and began to make comparisons that no one has made before. I am now collecting Point Spread Functions (ideal infinitesimal points emitting spherical waves of light) and comparing that data with points that actually have a little bit of size to them. I am actually testing the phase retrieval algorithm that will be used on the James Webb. This means that if the James Webb looks at a star that can not be treated as a point source, my data will show whether the algorithm will work.

Have a good week,

Daniel Pamplin

Updates from Professors

From Dr. Tim Head:

Hello folks,

The first few of weeks of summer have been busy. This is my first Dango of the summer so I'll go back a bit. I've mostly been reading about graphene, writing grants and giving preview tours to prospective students, oh and taking care of little Timothy while daycare was closed or he was sick (he's all better now).

While I've been working on these things, Keller has been working for me. He has been collaborating with Holly's dad, Luke Perkins, on how to convert the phonon-imaging data acquisition with an FPGA board. I should let him say more about that.

We also received safety cabinets from the campus safety and compliance office (or whatever their name is), and we got those installed.....One large one in the machine shop, and two smaller cabinets for my lab and the nuclear lab. We also were given an MSDS holder to put near the door of one lab, and we populated that with the appropriate reading materials....I think at some point we are supposed to have internal labels for these chemicals, but I'm not going to worry about that until we are told.

While we were in the machine shop, we decided that the nitrogen generator took up too much room, and so Keller spent some time building a shelf to house the nitrogen separator on the wall so that we could move the Dewar and compressor underneath and save lots of space (We needed more after moving the Flammable cabinet into the shop). I think that has worked out well, and the whole shop looks nicer and less cluttered.

We have also started to work on repair of the liquid nitrogen generator. It seems that when the water was turned off last summer it overheated and caused several water leaks (either that or 3 leaks in separate pieces of pipe all chose exactly the same time to happen). So we are trying to fix those. I am concerned that these pipes may have worn down (by reaction with the water) and the whole heat exchanger may now need to be replaced, but we are trying to fix the leaks we have and get things going again. If more pop up, we may have bigger problems.

I think that is most everything. It has been in the 105-9 range every day for the past couple of weeks here until Monday when we got enough rain to knock the temps down to the mid 90's. We're supposed to be above 100 again the rest of this week.

One final thing; thanks to the SPS officers for getting in the chapter report to national. We already received compliments from the president on what you guys (SPS members) do. I hope that everyone is having a great summer and learning a lot!

Tim

Keller in the cleaner work room

From Dr. Rusty Towell:

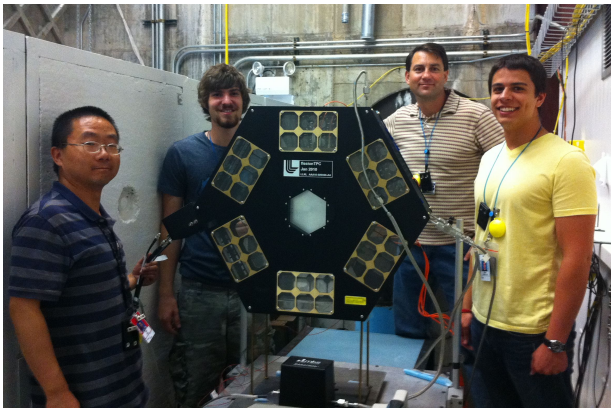
Hello Dango,

On Monday of this week I gave an invited talk at the Nuclear Physics Working Group meeting taking place in Montauk on Long Island. This talk was an update on the NIFFTE project. The meeting was one of three meetings that make up the annual Summer Nuclear Data Week sponsored by the National Nuclear Data Center.

Early Tuesday morning I flew to Abilene and started driving to Los Alamos. Wednesday I arrived in Los Alamos in time to go to lunch with Ryan, Eric, and Qu. It was good to see the LANL division of the ACU Nuclear Physics Research Group. For the rest of the week we alternated between them showing me around the experimental area and me explaining some of the physics and motivation for the experiment. Due to LANL deciding to build a large experimental building near our beam line, NIFFTE won't take neutron data this summer. The good news is this should give us extra time to further develop the slow controls for the experiment. Ryan and Eric, along with Dan (a recent graduate from Colorado School of Mines) are now all set up to accomplish great things this summer. So we should be in great shape when we finally start taking data this fall.

Grace and Peace,

Rusty



Qu, Eric, Rusty and Ryan at LANSE

From Hai Qu:

Dear Dango,

This week we have configured and tested MIDAS with remote HV control on the daq machine at 90L. Also I have been tried to get the data monitoring framework to work with histograms from event reconstruction. I will leave LANL next week for the ANS meeting. Hope to get back with you soon.

Hai Qu

In Other News

CEU PROGRAM, East Lansing 2011

APPLICATION DEADLINE: 1 August 2011

What: Conference Experience for Undergraduates (CEU) - Fourteenth Annual
Where: 2011 DNP Meeting, East Lansing, MI
When: 26-29 October, 2011
Sponsored by: NSF, DOE, DNP

All undergraduate students who have participated in nuclear physics research are invited to apply! Students will present research posters and participate in several CEU and conference related events. Travel and lodging awards will be granted to a number of the top qualifying students. Please refer to the CEU website for more detailed information, updates, and application information:

http://physics.westmont.edu/ceu/

PROGRAM

CEU11 will include the following highlights: student research poster session, undergraduate nuclear physics seminars, graduate school information session, CEU social reception, and regular DNP conference events, including attendance at invited and contributed talks.

QUALIFICATION AND APPLICATION

Students (fall 2011 returning undergraduates) who have participated in experimental or theoretical nuclear physics research are invited to apply. The online application (found on the link above) consists of a research abstract and a brief summary of the student's individual contribution to the larger group effort. Application deadline is 1 August 2011. Applications will be reviewed and travel and lodging award decisions will be based on the quality of the research, and the imagination and creativity reflected in the student's contribution.

QUESTIONS

Contact Warren Rogers <ceu@westmont.edu>

ALL UNDERGRADUATE STUDENTS WHO HAVE PARTICIPATED IN NUCLEAR PHYSICS RESEARCH ARE ENCOURAGED TO APPLY!