Minutes of the 7 Dec 2007 UEC Meeting

UEC Present:

Barberis
Hooper
Kopp
Kotwal
Landsberg
Pitts
Polly
Sawyer
Slaughter
Soderberg
Tollefson

GSA Present:

Benitez
Dorland
Forrest
Pianori
Strauss

Meeting Summary

Question and answer sessions held with Director Oddone and Deputy Director Kim. Joel Butler spoke on the US contributions to CMS with an emphasis on plans for future upgrades. Reports from the Government Relations and Users Meeting sub-committees were given.

Upcoming Dates
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Jan 25-26 2nd Project X Physics Workshop
Jan 31-Feb 2 P5 at Fermilab
Feb 14-15 HEPAP Meeting

Meeting with Director Oddone

(UEC) Can you give us a brief update on the accelerator?

(PO) Right now they are trying to isolate the source of a vacuum leak in the linac. Startup from the shutdown has been slowed by several unrelated problems. Once these problems are addressed, we look forward to strong Tevatron performance. Antiproton production is doing very well now, having recently set several records for production rate.

(UEC) What can you report from the HEPAP meeting?

(PO) The most important part is the new charge to P5 under a couple of different scenarios. The first scenario is how to prioritize the HEP program with only cost of living increases over the next 10 years? Even to justify the $800M currently in the budget, we will need an attractive physics program. The other scenario will be more along the lines of exploring possibilities with a doubling of the budget over the next 10 years. The presidential budgets have been starting out with this type of scenario, but last year we ended up with only half of the increase by the time the actual budget was resolved. A continuing resolution this year that maintains funding at last year's levels is actually an 18% cut relative to what is in the president's budget. This is because the current proposed budget assumes the other half of last year's increase along with this year's installment of the doubling plan.

Now is the time that it is very important for the university-based users, and the presidents of their colleges, to write government representatives in support of the increased funding to physical sciences. There is currently a letter-writing campaign organized by the APS at: http://www.congressweb.com/cweb4/index.cfm?orgcode=apspa&hotissue=74 Out of the first 700 users who have participated, only 6 selected Fermilab from the affiliated facility pull-down menu. This lackluster response from the Fermilab user-base was even noticed by Denis Kovar. As of the last count, Fermilab users who have participate is up to 75, but a much stronger showing is still needed.

If no new FY08 funding bill is passed and we remain in a continuing budget resolution, it would result in a loss of about $30M in the DOE HEP budget in a year when we are trying to ramp up new efforts like JDEM and NOVA.

(UEC) What is the timescale for the P5 report?

(PO) We expect a verbal report in March, followed by a written version in April. P5 is trying to also put together a 10-year plan. If you assume the optimistic doubling over 10 year it is really closer to 50% with inflation. Integrate the current DOE HEP budget of $800M that goes to $1.6B over the course of the next 10 years, which effectively becomes $1.2B after adjusting for inflation. We have to convince Congress that it is important to keep a US effort in HEP, and it will take an investment beyond the normal budget for a large project like the ILC. Again, we HAVE to have a compelling plan for the $800M budget in an environment without ILC under construction and programs at SLAC and the Tevatron shutting down.

(UEC) What can you say about the prospects for Tevatron running in 2010? (PO) We need to resolve a 2010 run by March, and evaluate whether it comes at the cost of other programs. Hopefully the funding agencies will want to treat the Tevatron well in its final year such that the impact to other areas is not significant.

(UEC) Have you been getting much feedback on the proposed Project X?

(PO) We have had lots of good comments from the Project X proposal that Young-Kee has been presenting. When P5 comes we will present the project again. Many people in the field have lost

sight of the importance of the flavor frontier. While the energy frontier gets to new production modes, neutrinos are really the only area where we have definitively seen physics beyond the Standard Model. In addition, lepton flavor violating experiments have an enormous reach. Add all these areas together and there is a nice program. There is a misperception that many of these programs were shut down in the past due to a lack of interest, but in reality many were approved and budget constraints were just too tight. Several of these experiments have an even better sensitivity in the context of a machine we would build today. It is clear that the first thing we need is a 'yellow book' documenting the physics potential. The second key is to put together the interesting pieces of accelerator technology in conjunction with other laboratories. There will also be pressure on us to present a preliminary cost estimate. It is important that this estimate be accurate. Without a projected cost, HEPAP and P5 cannot begin to build it into a budget scenario

Meeting with Deputy Director Kim

(UEC) What kind of preparations are being made for the P5 visit?

(YKK) P5 will review the ILC plans, Tevatron extensions, LHC upgrades and Project X. They will also go to SLAC and BNL to review other aspects of the US program. By then we need to have the physics case clearly established in each of the four Project X areas, neutrinos, kaons, muons, and anti-protons. Each area could have multiple experiments, so we should make a staged and strategic plan. Also need a clear description of the R&D that is still needed for the various efforts. Each working group will need regular meetings to establish the physics case and timeline. Overall, we are aiming for about a 100 page document. This will require lots of work done between now and the 2nd workshop, so that the working groups can present the emerging picture at the workshop.

(UEC) Given the short timescale, do you see this primarily documenting endeavors that have already been established?

(YKK) Yes, I do not see much in the way of developing new experiments, but more along the lines of solidifying the proposals that we have already been discussing.

(UEC) Sounds like a challenge to sew all four components into one coherent picture. For instance, aren't the anti-proton experiments in direct conflict with the demand for resource from other areas?

(YKK) Yes, hopefully understanding the interplay between these areas will be taken into consideration by the working groups at the next workshop.

(UEC) Can you comment on the trade-off between presenting a compelling program without making too many promises regarding the experimental program?

(YKK) We need to outline a roadmap that presents a very interesting path. However, that path might change over the next few years depending on physics results, for example results from LHC, being established, new ideas that might come along, etc.

(UEC) Pier mentioned the need to get a cost together while being careful to recognize that any number given too prematurely will stick.

(YKK) We'll we need to give a funding profile of the needs to resolve technical issues, etc. We need to specify how much money will it take for the R&D, and a range of costs for the construction. Also need to profile the experimental costs for detector construction, which means we need to think about which experiments come first.

(UEC) Is there any update on response from HEPAP, or feedback from the first workshop?

(YKK) I think our presentation at the HEPAP meeting was very well received. General responses from the panel and those that attended the HEPAP meeting were quite positive. Of course, this all has to go through P5, which will be a very important stage. People were impressed that users from 70-80 institutes registered for the workshop. The UEC has really done a great job helping this effort get started.

(UEC) Is Jan 25-26 fixed for the 2nd Project X Workshop and safe to announce?

(YKK) Yes.

(UEC) There is still some sentiment out there that the physics is marginal and composed of canceled experiments, etc. It needs to be made clear that many of the experiments, particularly in the kaon sector, that are much improved from their original incarnations.

(YKK) Yes, it will be useful to get a document with all of the details of the experiments. It would help if the UEC could help engage users in the development of the documentation. The UEC can play an important role in helping to prepare the documentation.

Joel Butler on CMS

Joel Butler, US CMS Research Program Manager, spoke to the UEC about recent developments and eventual CMS upgrade ideas.

Some LHC facts:
Billion interactions per second @ 14 TeV
26.659 km circumference
9300 magnets
1.9 K operating temperature
Injection at 450 GeV from SPS
Stored energy of 350 MJ (2 MJ at Tevatron)
20 event per crossing

Some CMS facts:
solenoid 6m diameter by 13m long
4T field
12500 tons of steel

66 million pixels in silicon pixel detector
11 million strips in silicon microstrip detector
20 interactions per beam crossing

The current status of the LHC is that one of the eight sectors has been fully commissioned. The goal is to have the rest cold by May 2008. Challenging since the cooling cycle takes about two months.

The US contribution to CMS has been substantial. The combined DOE and NSF contribution towards construction has been about $167M. There is a Tier 1 computing facility at FNAL along with 7 Tier 2 computing centers at US universities. We also have an LHC Physics Center and Remote Operations located at FNAL.

Given the scale of the detector and the anticipated luminosity, it is natural to plan upgrades on a 8 year timescale. It is a sobering fact for the detector that the anticipated luminosity upgrades for an SLHC would produce 10 times the radiation and 400 events per crossing. One of the primary challenges in maintaining the detector performance will be producing pixel and tracker detectors with higher granularity. to degrade after 5 years. Given the US CMS role in tracking and triggering, it is clear that we will play a major role in the SLHC upgrades as well.

(UEC) What is the run strategy at the LHC? How many day per year does the collider run?

(JB) They run for about 7 months. With 50% efficiency it works out to about 100 days per year. Shutdowns are in the winter due to heating costs, which is opposite to the US where shutdowns are in the summer to avoid cooling energy demands.

Government Relations Update

A letter is circulating Biggert-Tauscher-Holt to provide 4.5B in FY2008 to the DOE Office of Science. (Note after meeting: this letter has 122 signees as of Dec 11.) The January meeting in preparation for the DC Trip will be held at SLAC on Jan 9. About 5 representatives from the FNAL UEC will travel to the meeting. The primary goal is to tune the message for the visit in March. The regular UEC meeting in February (possibly March) will be very important for the entire contingency from the FNAL UEC to get together, explain how the trip works to new members, describe what can be expected, and role play. It looks like week of March 10 is still the best possible date for the trip. Work is progressing on the message and building the "particle physics in picture" pamphlet.

Need to follow-up with local trip volunteers from the various universities. There is a clear ask right now for the House with the signing of the currently circulating letter. More generally, it is also the right time to ask Congress to support president's science budget.

Users Meeting Update

The data has been set for Jun 4-5 and the auditorium reserved. Public lecture candidates have been reviewed and invitations will be extended to the top choices. A list of political dignitaries has been created.

Dates for Future UEC Meetings

Jan 18, Feb 15, Mar 7, Apr 11, May 9

Submitted by: Chris Polly, UEC Secretary