

The LHC Computing Grid in the starting blocks



The metallic globe illustrating the Worldwide LHC Computing GRID (WLCG) in the CERN Computing Centre.

The Worldwide LHC Computing Grid (WLCG) collaboration has been in place since 2001 and for the past several years it has continually run the workloads for the experiments as part of their preparations for LHC data taking. So far, the numerous and massive simulations of the full chain of reconstruction and analysis software could only be carried out using Monte Carlo simulated data. Now, for the first time, the system is starting to work with real data and with many simultaneous users accessing them from all around the world.

"During the 2009 large-scale computing challenge (STEP'09), several major milestones were achieved: first the data transfer rates sustained were well above what

As the Large Hadron Collider ramps up operations and breaks world records, it is an exciting time for everyone at CERN. To get the computing perspective, the Bulletin this week caught up with Ian Bird, leader of the Worldwide LHC Computing Grid (WLCG). He is confident that everything is ready for the first data.

was actually designed for – we achieved sustained aggregate data rates close to 4 GB/s – more than twice that required. This is equivalent to transferring a DVD of information every second. Secondly, the Tier 1 sites were able to show that they could accept this data stream, archive it on tape and simultaneously recall data for processing – all at the rates required during full scale LHC running, and in many cases well in excess of that rate. Finally, but perhaps more significantly, the experiments were able to demonstrate that the system could support large numbers of users running 'real' physics analyses on the data", says Ian Bird.

(Continued on page 2)



A word from Sergio Bertolucci

Prepared for first physics

The 2009 start-of-run has allowed the LHC experiments to do some remarkable things. All the detectors are performing according to specifications; the turnaround time to analyse data is strikingly short; and real and simulated data agree impressively well. Above all, they have started to nourish the enthusiasm of the wide community of physicists – in particular young people – with long anticipated real data.

This is just the beginning but we can now look to the New Year with anticipation and confidence. The first months of 2010 will allow us to rediscover phenomena already known to scientists – the so-called Standard Model physics. This is a necessary starting point in the search for new physics. If Nature has put some riches within our reach, then there is a chance that we might see the first signs by the end of the year (for example, supersymmetry). However,

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A word from Sergio Bertolucci

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Prepared for first physics

one of the main goals of the 2010 run remains the observation of the top quark, which was first observed at Fermilab in the USA in 1995 but which has not yet been observed in Europe.

The collected luminosity of the 2010 run at 3.5 TeV per beam will allow CERN's experiments to amass a number of top quarks that is competitive with what the Tevatron's experiments have collected so far. Moreover, the measurement of the cross-section and the study of the top quark production mechanism will allow all the experiments to fine-tune their performances in preparation for claiming signals from new physics.

The New Year opens a new phase for the whole laboratory: when the machine reaches a stable phase with high-energy collisions routinely produced, the eyes of the world will turn towards the experiments and to their large communities of scientists spread all over the world who will exploit and analyse the data. The role of CERN will adapt to this transition, although the main goal will stay the same as we ensure that the entire infrastructure behind the experiments works properly and effectively. As CERN prepares for the new phase we can safely say that we are more than ready for it.

All my best wishes to all CERNois for a scientifically exciting 2010!

*Sergio Bertolucci,
Director for Research and Computing*

The LHC Computing Grid in the starting blocks

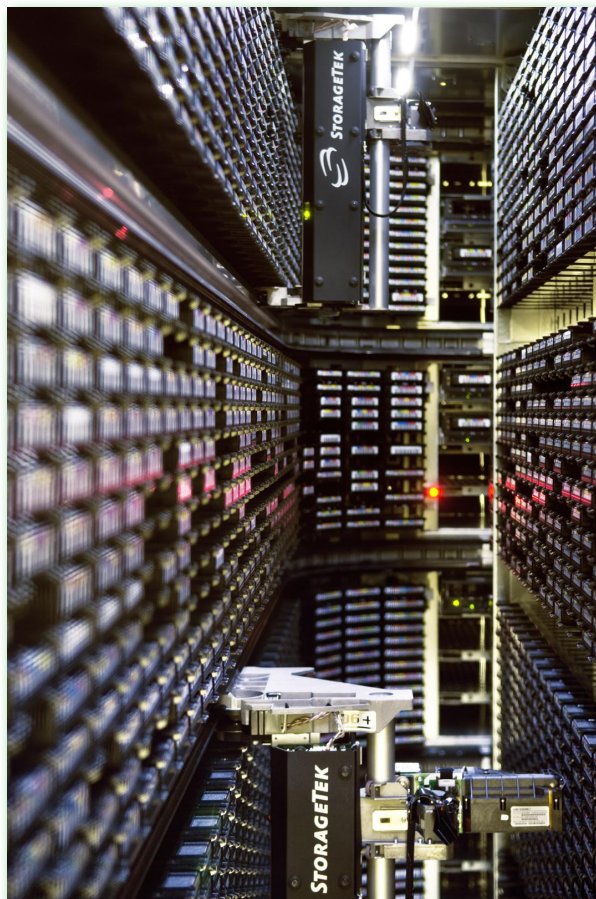
(Continued from page 1)

Of course, the experiments have actually been collecting real data from cosmic rays for the past several months (not to mention some real collision data in the last weeks!) and have been putting the entire grid system through its paces so as to align and calibrate their detectors in preparation for full-scale data taking. "Not only do we believe the system is ready, but it is actually in daily use already!", confirms Bird.

Despite all possible simulations and tests that can be performed, no system can be fully understood until it is in use for real. "Undoubtedly there will be surprises when we start handling real data and we have to be ready to react and adapt to those situations. While in 2009 great steps were made in supporting many more users than just the experts, we still have a long way to go. This will no doubt be one of the areas where we have to be ready to adapt and improve things. There are several developments in hand that should help in this area and deploying those will happen this year", assures Ian Bird.

During the past several years WLCG has made use of several grid infrastructure projects, including EGEE in Europe (<http://eu-egge.org/>) and OSG in the USA (<http://www.opensciencegrid.org/>). Now, the landscape of European Grids is changing because the EGEE will come to an end in April 2010 and a new structure based on National Grid Infrastructures with European level coordination will be put in place. "This is potentially a major change in the underlying support structures for WLCG and, of course, the timing of this – just as the LHC physics programme takes off – is unfortunate", admits Ian Bird. "However, that is the way it is and we have to focus on making this transition as smooth as possible".

At the time when such a big project reaches this phase, the feelings of people who have built it must be of real anticipation. "Certainly not all of the grand ideas that had been discussed have come to fruition, but on the other hand today we really do already support data rates and workloads well in excess of those originally planned", says Ian Bird. "The worldwide collaboration in computing that we have built in WLCG is



Inside view of a Sun StorageTek SL8500 tape library in the Computing Centre.

really a first and I think we can all be proud of that – this surely will serve as a model for other international science communities that are on the horizon that will eventually produce data in amounts that will dwarf what LHC will produce, but we did it first! But now it really is time to put this to the test with real data ..."

Danielle Amy Venton

ISOLDE steps up a gear

Since 1967, the ISOLDE facility has been dedicated to the production of a large variety of radioactive ion beams for many different experiments in the fields of nuclear and atomic physics, solid-state physics, life sciences and material science. Protons from the PS Booster hit the ISOLDE targets and produce radioactive elements, which are then ionized, mass-separated and delivered to the experiments.

Over the years, experiments at ISOLDE have produced many valuable results in different fields, from studies of nuclear shapes to accurate measurements of parity violation, and have made important contributions to the understanding of the formation of heavy elements in explosive stellar processes. "This was possible thanks to several upgrades of the facility that took place over the years", says Alexander Herlert, ISOLDE physics coordinator. "One of the major upgrades was the installation of REX-ISOLDE, which bunches, charge-breeds and accelerates beams after they have been produced". In 2007, a new radiofrequency quadrupole cooler and buncher improved the emittance and time structure of the beams.

The High Intensity and Energy ISOLDE project (HIE-ISOLDE), an important upgrade of the ISOLDE facility, was approved at the Research Board's December meeting. Thanks to a new superconducting linear accelerator and an improved target installation, HIE-ISOLDE will be able to provide higher energy and higher intensity beams to the experiments. New opportunities will open up for nuclear physics with radioactive ion beams at CERN.

The Research Board has just approved an even more important upgrade which will increase the beam energy from 3 MeV/nucleon to 10 MeV/nucleon and should significantly improve the intensity of the radioactive beams. "With previous energies we were able to study nuclear properties through Coulomb excitation. Using this technique, the MINIBALL experiment produced many important results over the last seven to eight years", says Yorick Blumenfeld, spokesperson of the ISOLDE Collaboration. "Thanks to HIE-ISOLDE, we will be able to study transfer reactions, in which one or more nucleons are transferred between the projectile and the target. This will open up new possibilities to understand nuclear structure over the entire nuclear chart. HIE-ISOLDE will be the only facility to post-accelerate elements as heavy as radon".

The ISOLDE community currently comprises about 500 users. Funding for the new facility will come from both CERN and external

funding agencies. The cost of the upgrade is estimated at around 36 million CHF. Under the guidance of project leader Yacine Kadi the new installation should be available for experiments in 2014.

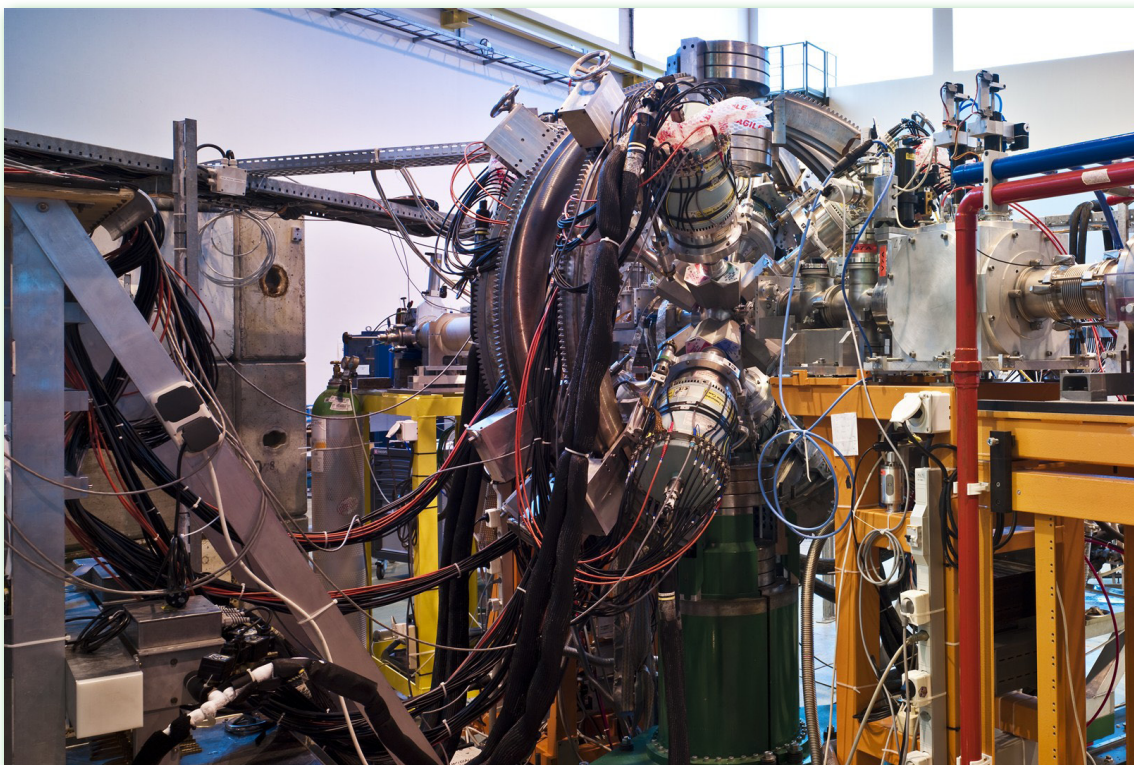
CERN Bulletin



Did you know?

Radioactive ion beam experiments at CERN have developed and used many pioneering techniques. Two examples are the implementation of lasers in both the production of beams and the spectroscopy of isotopes. In the first case, the accurate tuning of the laser wavelength allows very selective ionization of a specific element and thus the production of pure beams. This feature is very important for precision studies of the structure of the nucleus.

Laser spectroscopy has been widely used at ISOLDE for the study of nuclear ground state properties, such as nuclear spin and charge radii.



A view of the Miniball experiment installed at the ISOLDE facility.

A coffee-time challenge

If you've been to the coffee areas in Restaurant

1 you've probably noticed the 'LEP event' table tops, installed for the symposium and exhibition 'From the Proton Synchrotron to the Large Hadron Collider - 50 Years of Nobel Memories in High-Energy Physics'.

There are 16 events in total (in two areas), four from each of the four LEP experiments,

Can you tell a Z from a WW? The Bulletin is offering a prize for deciphering LEP events on show in Restaurant No. 1.

and they include examples of different particle decays observed at LEP during its 11 years of operation. The list below indicates the decay channels represented.

We are offering a prize of the ATLAS pop-up book, 'Voyage to the Heart of Matter', for the correct identification of all 16 events.

Entries should indicate the table number corresponding to each of the decays listed.

There will be a draw on 19 January to pick the winner from entries that correctly identify all 16 events. Please email your answers to

Bulletin-Editors@cern.ch

$Z \rightarrow e^+e^-$	$WW \rightarrow e\nu\mu$
$Z \rightarrow \mu^+\mu^-$	$WW \rightarrow \mu\sigma\mu$
$Z \rightarrow \tau^+\tau^-$	$WW \rightarrow \tau\tau\tau$
$Z \rightarrow \text{quark-antiquark}$	$WW \rightarrow \tau\nu\mu$
$Z \rightarrow \text{quark-antiquark-gluon}$	$WW \rightarrow \text{quark-antiquark } \mu\nu$
$ZZ \rightarrow e^+e^- \mu^+\mu^-$	$WW \rightarrow \text{quark-antiquark } e\nu$
$ZZ \rightarrow \text{quark-antiquark } e^+e^-$	$WW \rightarrow \text{quark-antiquark } \tau\nu$
$ZZ \rightarrow \text{quark-antiquark } \mu^+\mu^-$	$WW \rightarrow \text{quark-antiquark quark-antiquark}$



Official news

Members of the personnel shall be deemed to have taken note of the news under this heading. Reproduction of all or part of this information by persons or institutions external to the Organization requires the prior approval of the CERN Management.

OFFICIAL HOLIDAYS IN 2010 AND END-OF-YEAR CLOSURE 2010/2011

(Application of Articles R II 4.38 and R II 4.39 of the Staff Regulations)

Official holidays in 2010 (in addition to the special leave during the annual closure):

- Friday 1st January (New year)
- Friday 2nd April (Good Friday)
- Monday, 5th April (Easter Monday)
- Thursday 13th May (Ascension day)
- Friday 14th May (compensation granted for 1st May)
- Monday 24th May (Whit Monday)
- Thursday 9th September ("Jeûne genevois")
- Thursday 23rd December (compensation granted for 25th December, Christmas)
- Friday 24th December (Christmas Eve)
- Thursday 30th December (compensation granted for 1st January 2011, New Year)
- Friday 31st December (New Year's Eve)

Annual closure of the site of the Organization during the Christmas holidays and day of special leave granted by the Director-General :

The Laboratory will be closed from Wednesday, 22nd December 2010 to Tuesday, 4th January 2011 inclusive (without deduction of annual leave). The first working day in the New Year will be Wednesday, 5th January 2011.

NEW SAFETY RULE FOR CHEMICAL AGENTS

The following Safety rule was issued on 8 January 2010:

- Safety Regulation SR-C Chemical Agents:

<http://cern.ch/regles-securite/SR-C.htm>

This document applies to all persons under the Director-General's authority.

It sets out the minimal requirements for the protection of persons from risks to their safety and health arising, or likely to arise, from the effects of hazardous chemical agents used in any CERN activity.

All Safety rules are available on the following web pages:

<http://www.cern.ch/regles-securite>

Safety Commission

Human Resources Department
Tel. 73903



Take note

COMMUNICATION FROM THE CERN PRINTSHOP

It was brought to our attention that the numbering of the weeks in the calendar that the CERN Printshop distributes free of charge does not follow ISO Standard 8601 (see, e.g., http://en.wikipedia.org/wiki/ISO_8601) where week number 1 contains the first Thursday of the year. A corrected version (available at http://cern.ch/XML/CERNCal_2010_ISO.pdf) has been produced that those interested can download and print.

CERN SHUTTLES - NEW REGULAR SHUTTLE SERVICES AS FROM 11/01/2010

As of Monday 11 January a new regular shuttle service (from Monday to Friday) will be available to facilitate transportation

- within and between both CERN sites, Meyrin and Preessin;
- to and from the following LHC points: ATLAS, ALICE, CMS, LHCb.

For further details, please consult the timetable for this service at the following url:

<http://gs-dep.web.cern.ch/gs-dep/groups/sem/ls/RegularShuttleTimetable.htm>

We should also like to take this opportunity to encourage you to use the new regular TPG Y bus service rather than the special on-demand CERN transport service to and from Geneva Airport whenever possible. The TPG buses run from 06:00 to 00:30. For further details, please consult the TPG timetable at the following url:

<http://www.tpg.ch/fr/ligney>

Please do not hesitate to give us your feedback on the shuttle services by e-mail to veronique.marchal@cern.ch.

In case of problems with the shuttles, please contact 75411.

*GS-SEM Group
Infrastructure and General Services Department*



Academic training

CERN ACADEMIC TRAINING PROGRAMME 2009/2010

LECTURE SERIES

20, 21, 22 January 2010

11:00-12:00 - Main Auditorium,
Bldg. 500

Physics and Analysis at a Hadron Collider

by Dr. Douglas Glenzinski (FNAL)

Physics and Analysis at a Hadron Collider - An Introduction (1/3)

This is the first lecture of three which together discuss the physics of hadron colliders with an emphasis on experimental techniques used for data analysis. This first lecture provides a brief introduction to hadron collider physics and collider detector experiments as well and offers some analysis guidelines. The lectures are aimed at graduate students.

Physics and Analysis at a Hadron Collider - Searching for New Physics (2/3)

This is the second lecture of three which together discuss the physics of hadron colliders with an emphasis on experimental techniques used for data analysis. This second lecture discusses techniques important for analyses searching for new physics using the CDF $B_s \rightarrow \mu^+ \mu^-$ search as a specific example. The lectures are aimed at graduate students.

Physics and Analysis at a Hadron Collider - Making Measurements (3/3)

This is the third lecture of three which together discuss the physics of hadron colliders with an emphasis on experimental techniques used for data analysis. This third lecture discusses techniques important for analyses making a measurement (e.g. determining a cross section or a particle property such as its mass or lifetime) using some CDF top-quark analyses as specific examples. The lectures are aimed at graduate students.



Take note

PUBLICATION OF THE BULLETIN IN 2010

The table below lists the 2010 publication dates for the paper version of the Bulletin and the corresponding deadlines for the submission of announcements. Please note that all announcements must be submitted by 12.00 midday on Tuesdays at the latest.

Bulletin No. Week number	Submission of announce- ments (before 12.00 midday)	Bulletin Web version	Bulletin Paper version
2-3	Tuesday 5 January	Fridays 8 and 15 January	Wednesday 13 January
4-5	Tuesday 19 January	Fridays 22 and 29 January	Wednesday 27 January
6-7	Tuesday 2 February	Fridays 5 and 12 February	Wednesday 10 February
8-9	Tuesday 16 February	Fridays 19 and 26 February	Wednesday 24 February
10-11	Tuesday 2 March	Fridays 5 and 12 March	Wednesday 10 March
12-13	Tuesday 16 March	Fridays 19 and 25 March	Wednesday 24 March
14-15	Tuesday 30 March	Thursday 1 and Friday 9 April	Wednesday 8 April
16-17	Tuesday 13 April	Fridays 16 and 23 April	Wednesday 21 April
18-19-20 (Ascension)	Tuesday 27 April	Fridays 30 April and 7 May	Wednesday 5 May
21-22	Tuesday 18 May	Fridays 21 and 28 May	Wednesday 27 May
23-24	Tuesday 1 June	Fridays 4 and 11 June	Wednesday 9 June
25-26	Tuesday 15 June	Fridays 18 and 25 June	Wednesday 23 June
27-28	Tuesday 29 June	Fridays 2 and 9 July	Wednesday 7 July
29-30	Tuesday 13 July	Fridays 16 and 23 July	Wednesday 21 July
31-32-33	Tuesday 27 July	Friday 30 July	Wednesday 4 August
34-35	Tuesday 17 August	Fridays 20 and 27 August	Wednesday 25 August
36-37	Tuesday 31 August	Fridays 3 and 10 September	Wednesday 8 September
38-39	Tuesday 14 September	Fridays 17 and 24 September	Wednesday 22 September
40-41	Tuesday 28 September	Fridays 1 and 8 October	Wednesday 6 October
42-43	Tuesday 12 October	Fridays 15 and 22 October	Wednesday 20 October
44-45	Tuesday 26 October	Fridays 29 October and 5 November	Wednesday 3 November
46-47	Tuesday 9 November	Fridays 12 and 19 November	Wednesday 17 November
48-49	Tuesday 23 November	Fridays 26 November and 3 December	Wednesday 1 December
50-51-52/1-2	Tuesday 7 December	Friday 10 December	Wednesday 15 December

If you wish to publish a news article or an item in the General Information or Official News sections, please contact

Bulletin-Editors@cern.ch

If you wish to publish an announcement in the Staff Association section, please contact

Staff.Bulletin@cern.ch

Publications Section, DG-CO group



Seminars

MONDAY 11 JANUARY

GENERAL STAFF MEETING

10:30 - Main Auditorium, Bldg. 500

DG's New Year's presentation

CERN HEAVY ION FORUM

11:00 - BLDG. 160-1-009

Strong-field effects for lepton and photon production in collisions of relativistic heavy nuclei at RHIC and LHC

V. SERBO / NOVOSIBIRSK STATE UNIVERSITY

TUESDAY 12 JANUARY

TH STRING THEORY SEMINAR

14:00 - TH Auditorium, Bldg. 4

TBA

T. ORTIN / IFT MADRID

WEDNESDAY 13 JANUARY

TH THEORETICAL SEMINAR

14:00 - TH Auditorium, Bldg. 4

TBA [Multijet matching]

L. LONNBLAD / UNIVERSITY OF LUND

FRIDAY 15 JANUARY

PARTICLE AND ASTRO-PARTICLE PHYSICS SEMINARS

14:00 - TH Auditorium, Bldg. 4

TBA

G. ISIDORI

TUESDAY 19 JANUARY

SPSC MEETING

09:00 - Main Auditorium, Bldg. 500

Provisional Agenda for the 95th Meeting of the SPSC

C. VALLEE / CPPM, MARSEILLE

OTHER CERN EVENTS

14:00 - Main Auditorium, Bldg. 500

Open Media Training Session

LIZ PIKE, NADIA MARCHANT / IOPENER

TH STRING THEORY SEMINAR

14:00 - TH Auditorium, Bldg. 4

On the Existence of Meta-Stable Vacua in Klebanov-Strassler

N. HALMAGYI / LP THE PARIS, ENS PARIS & SPHT SACLAY

WEDNESDAY 20 JANUARY

ACADEMIC TRAINING LECTURE

REGULAR PROGRAMME

11:00 - Main Auditorium, Bldg. 500

Physics and Analysis at a Hadron Collider - An Introduction (1/3)

D. GLENZINSKI / FNAL

COMPUTING SEMINAR

11:00 - IT Auditorium, Bldg. 31-3-004

Design of an Expert System based on found Association Rules in Grid Job Monitoring Data

G. MAIER / UNIVERSITÄT LINZ

TH THEORETICAL SEMINAR

14:00 - TH Auditorium, Bldg. 4

TBA (particle physics with gamma ray telescopes)

G. SERVANT

THURSDAY 21 JANUARY

ACADEMIC TRAINING LECTURE

REGULAR PROGRAMME

11:00 - Main Auditorium, Bldg. 500

Physics and Analysis at a Hadron Collider - Searching for New Physics (2/3)

D. GLENZINSKI / FNAL

DETECTOR SEMINAR

11:00 - Bldg. 40-S2-D01

The PANDA-EMC – a high-resolution electromagnetic calorimeter based on PWO-II

R. NOVOTNY / 2ND PHYSICS INSTITUTE, UNIVERSITY GIESSEN

FRIDAY 22 JANUARY

ACADEMIC TRAINING LECTURE

REGULAR PROGRAMME

11:00 - Main Auditorium, Bldg. 500

Physics and Analysis at a Hadron Collider - Making Measurements (3/3)

D. GLENZINSKI / FNAL

PARTICLE AND ASTRO-PARTICLE PHYSICS SEMINARS

14:00 - Bldg. 1-1-025

TBA

J. GUNION