

Physics & Astronomy

FROM THE HOD (ASSOCIATE PROFESSOR ROGER REEVES)

We are deep into the semester now and hopefully all classes are ticking along nicely.

We had our first Staff/Student Liaison meeting on Wednesday afternoon. Thank you to all the class reps who volunteered to help out. Reports from the PHYS114 class reps were that they thoroughly enjoyed the department tours of a few weeks ago as it gave them quite a different picture of the activities inside these walls. We are hosting PHYS113 students this week and hopefully the same reaction is obtained.

On the official front the Faculty Meeting this week spent the majority of its time debating the proposal for uniform course sizes. The initial idea was only 15 and 30 point sizes, however there were other options proposed of 10, 15, unit sizes. It would be fair to say that the proposal met with a cold shoulder by those present.

On Tuesday next week at 12pm we will have a full department meeting. There are some planning exercises that I need to begin associated with the College review. Also, it will give the workshop staff a chance to report back on their lunch with the PVC. If there are any specific items you would like me to discuss/present or put on the agenda then please let me know.

THIS WEEK'S SEMINAR: - 11:00AM, FRIDAY 3 AUGUST

Dr David Wiltshire

Senior Lecturer of Physics, Physics & Astronomy Department,
University of Canterbury

Gravitational energy as dark energy: Towards a new concordance cosmology without Lambda

NEXT WEEK'S SEMINAR - 11:00AM, FRIDAY 10 AUGUST

Prof. Keiichi Akama

Department of Physics, Saitama Medical College, Saitama, Japan

A field theoretical foundations of the brane induced gravity

"Braneworld" is a picture based on an idea that we live in a 3+1 dimensional hyper-surface embedded in higher dimensional spacetime. "Brane induced gravity" is a model of braneworld gravity which is induced by quantum fluctuations of the matters trapped on the braneworld. Here we investigate a simple field theoretical model based on the Nambu-Goto action for the brane, and show how it realizes the brane induced gravity.

It turns out that the negative tension of the original Nambu-Goto brane can consistently give the right signatures for the kinetic terms of the matter, for the attractive gravity, and for fine tuning of the cosmological term.

PHYSICS & ASTRONOMY DEPARTMENT CONFERENCE (MICHAEL ALBROW)

This year the Department Conference will be held on **Monday 3 and Tuesday 4 September** in Maths 031. This is a great opportunity for students and staff to give presentations on their research and to find out exactly what is going on in the various groups in the Department.

All thesis students will give a 10 minute presentation on their research, with 5 minutes for questions. Students who are away at the time of the conference will give presentations later in the year, possibly in a Friday seminar slot.

Titles and abstracts should be emailed to Rhonda before 21 August. Abstracts should be about 1 paragraph in length.

OBSERVING RARE PLUTO OCCULTATION AT MOUNT JOHN

On the morning of August 1, Dr. Leslie Young (Southwest Research Institute, Boulder, Colorado) and Dr. Robert Howell (University of Wyoming, Laramie, Wyoming) used the 1-m telescope at Mount John to observe a rare Pluto occultation, with Pluto passing between a 13.2 magnitude star and observers in New Zealand and Southern Australia.

Young and Howell were part of a larger team that also had observers at Auckland, the AAT,



at Mt Canopus, and using a portable 14-inch telescope in Tasmania. A second group also observed this event, including Dr. Thomas Widemann (Obs. de Paris, France) at the two 0.6-m telescopes at Mount John. Young and Howell brought a special-purpose occultation system, including a dichroic mount, two low-read noise, frame transfer PhotonMax CCD cameras from Princeton Instruments, and two custom-built GPS-based pulse-train generators to precisely control the timing of the exposures.

Young and Howell used the night before the occultation (through breaks in heavy clouds) to check out and focus the instrument, to test observing modes, and to record photometry of the occulted star relative to field stars. The only two remaining concerns on the day before the event were whether the shadow cast by Pluto would cross Mount John (given the uncertainties in the Pluto and star positions), and whether the clouds would allow observations during the crucial three minutes of the occultation, just before 2 AM on the morning of August 1, 2007. As it happened, the skies were completely cloud-free all night.

An initial reduction of the occultation data showed that Mount John was, indeed, in the path of the shadow, and recorded the gradual dimming of the starlight caused by the defocusing of the starlight as it passes through Pluto's atmosphere. The data showed, for the first time, a brightening in the center of both the red and blue channels, the so-called "central flash." This phenomenon is caused by a refocusing of the starlight near the center of Pluto's shadow, and indicates that Mount John Observatory was very close to

the center line of the occultation path. Further analysis of the data will tell us about the vertical structure of temperature, pressure, and opacity in Pluto's atmosphere.

Despite being 100 thousand times thinner than Earth's atmosphere, Pluto's nitrogen atmosphere plays an important role in controlling the surface composition and appearance of this icy world. Nitrogen is both in the atmosphere and frozen on the surface. Since the surface pressure depends on the surface temperature, Pluto has complex seasonal changes. The frost shifts from one hemisphere to the other throughout its 248-year orbit, and the atmosphere may collapse when Pluto is farther from the sun. Astronomers want to follow changes to understand Pluto's seasons, and to provide a temporal context for the flyby of Pluto by the New Horizons mission in 2015. Occultations, such as this one just observed at Mount John, are by far the most sensitive tool for observing atmospheric change on Pluto.

AUGUST 2007 SCHOLARSHIPS – WEB SITE

View General Scholarships at:-

<http://www.canterbury.ac.nz/scholarships/resources/currentnoticeboard.shtml>

College of Science Scholarship

<http://www.canterbury.ac.nz/scholarships/noticeboard/august2007sci.shtml>

NEWS FROM THE PHYSICAL SCIENCE LIBRARY

(1). Astronomer turned hacker-hunter now featuring on YouTube...

In the late 1980's Cliff Stoll caught a German hacker that was using Berkeley computers to access military computers. Cliff Stoll wrote a classic book "The Cuckoo's Egg" (available in UC Library) recounting the chase. There is now a video re-enactment with many of the characters played by themselves. Someone posted the show to YouTube in six parts. Now a fan has pulled together the episodes and linked them on one page... <http://members.cox.net/bibliofuture/cliff> (scroll down for video)

(2) Using Open Source Software?

Nominations are now open for NZ Open Source awards .. <http://www.nzosa.org.nz/home>

(3) A catalogue of every book in the world?

Perhaps a bit mad to try and build an online catalogue of every book ever published? Read about the Open Library project – a wiki-based rival to the Google Books Library Project. -

http://news.bbc.co.uk/2/hi/uk_news/magazine/6924022.stm

Compare - <http://booksearch.google.com> and <http://www.worldcat.org>

(4) BSc Review

As part of the BSc review, UC Library has been asked for a statement indicating available resources for EVERY BSc subject. Information Librarians and Collection Services staff are beavering away having a detailed look at what we hold. Although a large job this is proving a very valuable exercise.

If you have anything you would like to contribute to the Newsletter, please email Ro on rosalie.reilly@canterbury.ac.nz:
Newsletter, Department of Physics and Astronomy, University of Canterbury, Private Bag 4800, Christchurch, Phone: +64 3 364 2404, Fax: +64 3 364 2469.