

Physics & Astronomy

FROM THE DEPUTY HOD (ASSOCIATE PROFESSOR PETER COTTRELL)

Last week I reported from the deep south, but temperatures aren't much warmer here. I can report that it was VERY cold (-8 C) in Gore last Saturday morning where Deirdre and I were visiting friends who have just moved there. And there was lots of snow through the Lindis Pass, then not much in the Mackenzie Basin, but then heaps again through Burkes' Pass and the Fairlie Basin. It was good to have a weekend when I couldn't do any work, although there was wireless broadband in the place we stayed in Wanaka!

The NZIP conference in Dunedin ended with the AGM and Jenni Adams is the in-coming President of the Institute for a two-year term, starting later this year. Congratulations and thanks to Jenni. The next major event in the NZIP calendar will be the July 2009 Conference here in Christchurch. We have just started a conversation with the ChemEd people as they will be meeting in Christchurch in July 2009 also. We are exploring the possibility of having the meetings at the same time and having a few joint plenary sessions. Could be an exciting week of lectures, workshops and demonstrations. And 2009 has also been designated by the International Astronomical Union as the International Year of Astronomy, and as was also pointed out to me it's the 400 anniversary of Galileo's invention on the telescope. A good year to be around the College of Science I would suggest.

We're all looking forward to Roger Reeves' return from leave next week. None more so than me as it has been quite a busy time these last several weeks, with a couple of conferences, meetings on various matters and yesterday my second College of Science Executive meeting, as well as a steady flow of Jade SMS agenda items. If you don't understand what these are about, I'd suggest you don't ask.

NO SEMINAR PLANNED: - 11:00AM, FRIDAY 13 JULY

SEMINAR NEXT WEEK: - 11:00 AM, FRIDAY 20 JULY

Asst. Prof. Chiang-Mei Chen

National Central University, Taiwan

Extremal Black Holes in 4D Gauss-Bonnet Gravity

We show that a four-dimensional Einstein-Maxwell-Dilaton-Gauss-Bonnet gravity admits asymptotically flat black hole solutions with a degenerate event horizon of the Reissner-Nordström type $AdS_2 \times S^2$. Such black holes exist for the dilaton coupling constant within the interval $0 \leq a^2 < a_{cr}^2$. Black holes must be endowed with an electric charge and (possibly) with magnetic charge (dyons) but they cannot be purely magnetic. Purely electric solutions are constructed numerically and the critical dilaton coupling is determined to be $a_{cr} \leq 0.48821970$. For each value of the dilaton coupling a within this interval and for

a fixed value of the Gauss--Bonnet coupling α we have a family of black holes parameterized by their electric charge. Relation between the mass, the electric charge and the dilaton charge at both ends of the allowed interval of α is reminiscent of the BPS (Bogomolny-Prasad-Summerfield) condition for dilaton black holes in the Einstein-Maxwell-Dilaton theory. The entropy of the DGB extremal black holes is twice the Bekenstein-Hawking entropy.

NEWS FROM JACK BAGGALEY

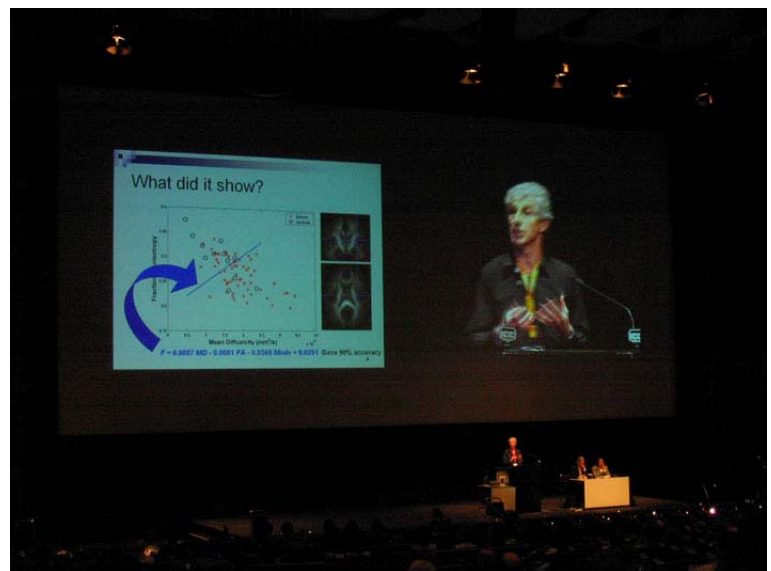
I am based in Oxford at the moment and have a study in St Hugh's College: there is a very pleasant view of the lawns and gardens of the College. However at the moment we have Summer English language Schools (good money-making for the College) and the peace is disturbed by hoards of mainly Russian, French and Spanish students.

Of ex Canterbury folk - I confer with Don Grainger, Scott Osprey and Gareth Thomas.

On the roads I'm impressed by the pedestrian-friendly traffic arrangements, and the many types of cycle contraptions that adorn the streets - standard bikes with large baskets on the front, family tandems, tandems with extra mini-bike at the rear for kiddie, bikes pulling cart containing toddlers.

MICHAEL AND MEGA-MICHAEL. (RICHARD WATTS)

Michael Chappell presenting his work at the recent International Society for Magnetic Resonance in Medicine (ISMRM) in Berlin. The conference hall was large enough to hold the entire 5500 conference attendance, although one or two may have missed this important presentation. Photo by Julian Maclaren (Elec Eng), who also presented at the same meeting.



Canterbury students Michael Chappell, Julian Maclaren (seated right to left) and Canterbury graduate Daniel Chong (student at back) enjoying a relaxing beer at the post-conference dinner after ISMRM in Berlin.

KIWI INVASION OF CERN [JENNY WILLIAMS]

CERN now has a critical mass of NZers visiting to work on the CMS experiment with summer students Rob Knejjens (UC) and Mark Hashimoto (Auckland) helping Alan Bell (UC Masters student who's resident at CERN this year) to build the Beam Scintillator Counters subdetector, and Sam Whitehead presently doing cabling work under the massive CMS detector. Alick MacPherson, a CERN-based kiwi who recently visited the department, is leading the beam radiation monitoring (BRM) group, and has organised an excellent project schedule for the summer students which involves an introduction to the detector and hardware as well as analysis tasks using the C++-based ROOT package which is widely used in high energy physics for carrying out analyses. Alick has also introduced a series of Friday seminars to train the BRM physicists to give effective presentations in a formal environment. In addition, since Sam is working in the CMS cavern which is about 5km away in Cessy, France, he has also acquired a CERN cell phone and car!

I've been helping CMS move towards another publication of the offline "Workbook" for new users, and getting the more comprehensive "software guide" ready for when there's some data to analyse, as well as investigating the possibility of setting up a remote CMS Data Quality Monitoring station in New Zealand.

The summer student lectures - and parties - started yesterday. It's a pretty packed programme of lectures on everything from particle and nuclear physics to data analysis, accelerator physics, electronics and cosmology. The CMS Times weekly newsletter is very interested in the NZ presence here, and will be featuring an interview with some of the team early next month.

Getting settled here took a while, as there's a pile of paperwork for new people to fill in, and getting the appropriate signatures provides a pretty comprehensive walking tour of the site. While it's great to be away from tornadoes and snow threats in NZ, over here we have had pretty much constant rain since I left. We had a hot sunny day the other weekend when we went for a look around Geneva. We started the day by watching a rather disappointing Tri-Nations defeat by the Aussies in an Irish Pub, and then stumbled across a huge Alinghi display in the middle of the city where there was a massive screen showing the start of the 6th America's Cup race. As well as interactive displays and stalls with Alinghi kit (no Team NZ), there were rows of deck chairs in front of the big screen, and several people handing out Swiss flags. Needless to say they were a happy bunch by the time I wandered by again 2 hours later.

I'll send another report in a week or two with some photos and a bit more info about what everyone's been up to.

EUROPE - JUNE 2007 (MIKE REID)

In June I spent four weeks in Europe, based around the DPC (Dynamical Processes) conference in Segovia, Spain. The first week was a visit with Luis Seijo and Zoila Barandiarán, a husband and wife team at Universidad Autónoma de Madrid. The University is out in the countryside north of Madrid, but they arranged a hotel for me near the city centre near a light rail station, so commuting to the campus was straightforward. I had some useful discussions about relating their calculations to my work. I also had some pleasant sightseeing and nights out in Madrid, the only problem being that not much seems to start in Spain before about 10:30pm or so.





On Friday I caught up with Roger, Karen, and Sarah, who had flown in that day. On the weekend I was supposed to go hiking in the mountains with Luis and Zoila, but it rained all weekend. Luis considered it to be outrageous that it was raining in Spain in June. However, on Sunday I took a train out to where they live, north of Madrid near the mountains, and we drove over the mountains to Segovia, the site of the DPC conference for the next week. Luckily the weather started to pick up in the late afternoon, so I was able to explore the old city. Segovia features a 2000-year old Roman aquaduct, built with no mortar, which was still

used until quite recently. Also an impressive castle (just like a Disney one!). The Royal Artillery used to be based there, so there is a museum with all kinds of interesting diagrams with various equipment and books on ballistics.

The conference was held inside what used to be a church. Pleasantly cool and at times even cold. A good opportunity to catch up with various old friends. At the dinner the New Zealand women were rather better dressed than the men (see photo). Unfortunately, Bill Yen (Georgia) was unable to attend due to illness, but we signed one of the conference posters to send back to him. The food in Spain was a pleasant surprise to me. Expensive, but often very good quality.

After another Friday night in Madrid I flew to Amsterdam. Unfortunately, my bag got lost somewhere in Frankfurt, where the luggage system had apparently been broken for a couple of days. The good side was that it saved me lugging the bag on the train to Utrecht, and it was delivered the next day.

I spent the week visiting Andries Meijerink at Utrecht University, where I spent three months in 2000. Andries was an Erskine visitor a few years ago. For most of the week I shared a room with Gary Burdick, who has been a frequent visitor at Canterbury. The weather was even worse than Spain - I think it rained every day. A highlight at the end of the week was poster presentations by Andries's first-year research project students, who spend a few weeks after exams doing some directed research and writing it up in pairs.

On Saturday I took the train to Paris. Much more pleasant than queuing up at airports, and no slower in terms of elapsed time. I emerged from the subway at the Luxemburg Gardens in the middle of an extremely noisy Gay Pride Parade. In Paris I visited Phippe Goldner and Olivier Guillot-Noel at Ecole National Superior de Chemie. Their work involves laser and EPR spectroscopy with an emphasis on materials for quantum information. Marie Curie (and various relatives) used to work on this campus, and



there is an interesting little museum that preserves her office, laboratory, and other artefacts, including a display of radioactive cosmetics (see photo).

The weather in Paris still wasn't great, but it was better than The Netherlands, and I managed to visit a few nice museums and gardens, as well as some late-night jazz clubs, with remarkably small rooms but remarkably stunning musicians. Of course, the food in Paris is generally very good (but still expensive).

Finally it was time to fly back to Hong Kong. I was pleasantly surprised by an offer to upgrade to business class on the flight from Frankfurt to Hong Kong, so I was able to get a good rest. In Hong Kong the sky was blue and the temperature 33. And the food was great (and cheap).

JULY 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/july2007sci.shtml>

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