

## In this newsletter



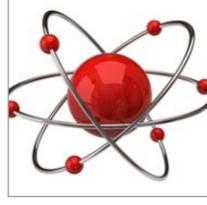
COLLABOR8.1 fosters early career collaboration



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## COLLABOR8.1 fosters early career collaboration



The COLLABOR8.1 meeting took place on 9<sup>th</sup> February at The University of Nottingham. It was the second instalment of the series of COLLABOR8 meetings, which are focused on fostering collaborations between early career researchers in theoretical and mathematical physics. Instead of presenting final results, the participants were encouraged to give short talks about open problems they encountered during their research. After each talk session the participants came together in smaller groups to discuss those problems.

This year's meeting attracted about 30 young researchers from all over England and comprised nine talks about a variety of topics in theoretical and mathematical physics. For instance, cosmology and gravity were very well represented by talks about particle production during inflation, dark matter from a nonlocal theory, the origin of physical scales from a local conformal invariant extension of the Standard Model and General Relativity, infinite derivative gravity and gravitational ghost corrections in multi-fields. Furthermore, there were talks about scattering amplitudes in string theory and supergravity and even a talk about machine learning and its possible future applications in theoretical physics. Another highlight of this meeting was the seminar by the keynote speaker Prof. David Tong (DAMTP). He explained why 'What is the gauge group of the Standard Model?' is still an open question.

The small group discussions after every session of three talks proved to be fruitful for new ideas and possible future collaborations. Participants had the chance to reflect more deeply about talks and got into contact with researchers from very different fields and places.

Overall the feedback from the attending researchers was very positive and some of them even expressed their interest in organising a future meeting. Hence, there are great chances for another COLLABOR8 meeting in the coming year.

*Organisers: Christian Käding (University of Nottingham), Edward Hughes (Queen Mary, University of London), Katy Clough (King's College London/ University of Göttingen)*

## Conference celebrates Stephen Hawking's 75th birthday



photo: Sir Cam

This International Conference on "Gravity and Black Holes" and the associated Public Symposium, organized by the Centre for Theoretical Cosmology (DAMTP, Cambridge), was held in honour of the 75<sup>th</sup> birthday of Stephen Hawking. About 180 participants attended the scientific conference for 3 days from 3<sup>rd</sup> July, while the preceding symposium, on Sunday 2<sup>nd</sup> July was attended by 450 people and reached a much larger public audience. The meeting was particularly relevant in light of the recent LIGO Scientific Collaboration's discovery of gravitational waves from black hole mergers and, consequently, the new window on the universe that this has opened.

The Public Symposium consisted of four popular lectures delivered by very well-known science communicators: Professors Brian Cox, Gabriela González, Martin Rees and Stephen Hawking himself. The afternoon meeting had remarkable impact through live-streaming videos of the lectures to the Discovery Channel social media websites across Europe, USA, Africa and Asia. Viewing figures indicated that, during the four hours the meeting was running, approximately 3.75 million people accessed the relevant Discovery Facebook and YouTube pages; this far exceeded the impact of all previous Discovery live-streaming events and sets a new benchmark in science engagement with the general public. All the lectures were of exceptionally high quality. Brian Cox eloquently described the development of modern concepts in physics which have defined the perception of our place in the Universe. Gabriela González described the exciting discovery of gravitational wave events by the LIGO team, while looking forward to a new era of gravitational wave astronomy. After the break for refreshments, Lord Rees, the Astronomer Royal, took the audience on a fascinating journey from small-scale exoplanets out beyond the observed universe to the so-called "multiverse". Finally, Stephen Hawking recounted his own life in physics and his contributions to momentous developments in our understanding of black holes and cosmology, which continue to remain at the heart of key theoretical and experimental programs to the present day.

The conference ended with some closing remarks by Bob Wald. After praising Stephen's many contributions to gravitational physics, Bob explained in some detail why Stephen's paper "Particle Creation by Black Holes" is such a monumental achievement. However, he did identify one flaw in the paper: the word "gauge" is misspelled four times!

<http://www.ctc.cam.ac.uk/activities/stephen75/programme.php>

*Organisers: Anne Davis, Malcolm Perry, Harvey Reall (Chair), Jorge Santos, Paul Shellard, Ulrich Sperhake, (all University of Cambridge)*

## Diverse program at quantum field theory workshop



QFT: Concepts, Constructions, Curved Spacetimes, University of York. This workshop held on 4<sup>th</sup> to 7<sup>th</sup> April covered several different but related aspects of mathematical QFT. The meeting was designed to bring into contact theoretical physicists and mathematicians working in these fields, and many participants have commented very positively on the diverse programme. By not overloading the programme with too many talks, participants had the opportunity to discuss and interact. We expect that several new research collaborations have been formed during this conference.

A special highlight of this conference were two special sessions, dedicated to two distinguished scientists who have made many important contributions to mathematical QFT throughout their careers. On Tuesday, there was a session dedicated Bernard Kay (York) on the occasion of his 65<sup>th</sup> birthday, and on Thursday, there was a session dedicated to Karl-Henning Rehren (Göttingen) on the occasion of his 60<sup>th</sup> birthday.

Some high-profile speakers were Vaughan Jones (Fields Medal 1990), Detlev Buchholz (Max Planck Medal 2008), Stefan Hollands (Xanthopoulos Award 2010). Also two PostDocs contributed to the programme by giving a talk or presenting a poster.

Slides of all the talks are available through the website

[www.lqp2.org/york17](http://www.lqp2.org/york17)

*Organisers: Dorothea Bahns (University of Göttingen), Chris Fewster (University of York), Gandalf Lechner (Cardiff University).*

## Nuclear physics summer school in fourth decade



The STFC UK Postgraduate [Nuclear Physics Summer School](#) is a biannual, two-week residential nuclear physics PhD students are exposed to forefront ideas in all areas of nuclear physics. The school aims at training the next generation of UK nuclear physics researchers and has been a cornerstone of their PhD programme for almost four decades. The topics covered by the school were chosen to reflect and support the UK nuclear physics program in theoretical, experimental and applied nuclear physics. About a third of the academic program was devoted to recent developments in nuclear theory.

This year the academic program of the Summer School held at Queen's University Belfast from 21<sup>st</sup> August included lectures by national and international research leaders; tutorials with early career postdoctoral researchers; Q&A sessions with lecturers and PhD student talks. The school is currently funded by the Science and Technology Facilities Council (STFC), although additional financial support was obtained from the IOP Nuclear Physics and Mathematical & Theoretical Physics Groups, as well as Mirion Technologies.

There were 47 PhD student delegates. 45 delegates were directly associated to UK nuclear physics research groups. 2 international students (from Oslo and Cologne) also attended. Lecturers were chosen based on their leading scientific research and pedagogical nature, and are all research-active, world-leading scientists in their field. The conference also ensured the participation of 1 lecturer from industry (James Cocks, Mirion) and the STFC Nuclear & Particle Physics outreach coordinators (Elizabeth Cunningham). These two lecturers, together with 1 academic and 1 postdoctoral tutor, engaged in an open table discussion during a 90-minute-long Career Sessions.

Student delegates also presented their own research in 10-minute talks in the evening session, to gain confidence in presenting their research to an expert audience. The preparation, delivery and question responses of all students was outstanding.

5 Early Career Research tutors led the tutorial sessions. Tutors represented different fields in the UK nuclear physics community, as well as a mix of ages, nationalities and post-doctoral experiences. Each tutor had a group of 9/10 students in the tutorial afternoon sessions, to discuss and reinforce the morning lectures.

The lecture material of the Summer School will be available in an STFC-curated website. All other information can be found in the website

<https://sites.google.com/site/uknpss2017/>

*Organisers: Dr Laura Harkness-Brennan (University of Liverpool), Dr Arnau Rios Huguet (University of Surrey)*

For submissions to the MTPG newsletter please send articles via email to

[steve.cohen@physics.org](mailto:steve.cohen@physics.org)

Submissions should be in an editable text format. Please include links for further information and contact details where appropriate.

Steve Cohen  
Editor