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Announcing

ISRP-11

11th International Symposium on Radiation and Physics

University of Melbourne, Victoria, Australia

21st - 27th September, 2009

FROM THE EDITORS

We've just passed through the June solstice, a fleeting instant in which the sun appears to stand still (in declination). In this season, the earth is near its apogee, and the southern hemisphere tilts away from the sun. And so the world turns. This quarter's Bulletin of the International Radiation Physics Society, a truly global community, spans the hemispheres to report some of what is happening in radiation physics and the Society.

Continuing a series of reports from the regional Vice Presidents, Chris Chantler, representing Australasia, brings us up to date with the progress of the nascent Australia Synchrotron, the nuclear reactor OPAL in Sydney, an International Forum on Future Directions in Atomic and Condensed Matter Research and Applications, and finally, preparations for the Society's next symposium, ISRP-11 (see detailed announcement).

From North America we have the 3rd installment of Paul Bergstrom's series of articles on the Monte Carlo technique. The ongoing installments will turn to practical applications and demonstrate the use of some of the standard codes to specific radiation physics problems.

And finally, we are encouraged to learn of the establishment of a novel research institution in Cyprus for the Middle East. The Cyprus Institute is building a world-class educational and research organization at the crossroads of East and West. It is hoped that this will engender not only vigorous international collaborations, including the light source SESAME in Jordon, but also understanding and reconciliation in a troubled area of this spinning world upon which we all share the ride.

Cheers,

Larry Hudson** and **Ron Tosh

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PRESIDENT 'S REPORT

I am, at the time of writing this column, in Prague for the first Council Meeting of 2008. Being here has brought home to me how lucky I am that the official language for international conferences is now English. I would not be able to function if Czech were the official language. It has not always been the case that English was the official language: fifty years ago it was quite common for papers to be delivered in the native language of the speaker. I remember engaging the services of interpreters for one international conference I was organizing in the 1990s.

At the 7th International Topical Meeting on Industrial Radiation and Radioisotope Measurement Applications which I am also attending I have been impressed at the standard of the papers given, more so because of the diversity of linguistic backgrounds of those delivering the papers. Papers have been delivered by Americans, Australians, Brazilians, Chinese, Czechs, Danes, Koreans, Portuguese, Russians, Spaniards, and so on. And as I have said, the standard of both the oral and poster presentations has been exemplary.

The teaching of English is being undertaken now in many countries, from the Primary School through to Secondary School. Teaching methods vary, and range from conversational level through to the formal study of grammar and structure.

European, Greek, Nordic and Slavic languages have strict rules of grammar and syntax, and it is therefore necessary that teachers in those countries teach students the formal structure of their native language. Students must know how to conjugate verbs, decline nouns, know whether a noun is masculine, feminine, or neuter, have adjectives agree with the sex of nouns, and so on. There are special verb forms to express present, past, continuing past, and conditional tenses. To communicate with precision a student must know these rules precisely. Mere extension of the conversational idiom is not acceptable. By contrast the English language seemingly has few rules of grammar. It is a polyglot language which contains Anglo-Saxon, Celtic, Latin, Greek, French and other influences. It seems to have rudimentary syntax.

But behind this simplicity lurks a complicated reality. There are subtleties in expression. "I shall", forexample, merely indicates that I intend to perform some action in the future. "I will" indicates that I am determined to take that action. These are but two usages of the future tense, and it would seem that it is of little importance which is used. Perhaps in conversational usage there is not much difference : in legal documents there is a world of difference.

Languages are dynamic: the structure of a living language changes with time. Perhaps the best indication of this is the difference between Shakesperean English (16th Century) and modern English. Ask any English pupil striving to understand the content of one of Shakespeare's plays how easy it is to understand, and the answer would probably be "it's hard, man." The spelling and meaning of words have changed, as has the syntax. Change has been gradual over the past four centuries, with differences in spelling, meaning and usage occurring in different countries. The English written in the United Kingdom, America and Australia is different in a number of subtle ways.

But now modern telecommunication and pop culture are having a large influence on English, and how it is written and spoken. Pop music, rap, MTV, all have influences on the way English is used in daily communication. Many learn English through listening to popular music as recorded on CDs, iPods or on MTV Channels on television. This is a thoroughly pleasurable way of becoming familiar with a language, as I found learning German by singing Schubertslieder. But this was based on the romantic poetry of Heine and Schiller: grammatical and syntactical.

Around me here, in Prague, I hear modern pop music, sung in English which is usually neither grammatical nor syntactical. And I can see the effect on the language: nouns used as verbs, adjectives used as adverbs, the misuse of words, and so on.

The cell-(phone) (mobile phone) is causing a significant distortion to the written language because of the abbreviations used in text (txt).

The importance of this is indicated by the fact that students are using txt interchangeably with correct English in their school work. There are some who can see no harm in this because the language is so dynamic: they believe that formality inhibits self expression. But therein lies the problem: no structure and permanence exists in the language and usage becomes spatially speciated to the extent that neighbouring communities cannot communicate effectively with one another. The very fluidity of the usage leads to obscurity and inability to communicate with a wider audience.

Despite this obvious limitation the teaching of English in Australia, and I suspect other countries, is becoming dominated by teachers who have no understanding of the importance of form and structure to the communication of precise information. This will rapidly erode the worth of English as an international language. We, asscientists, must therefore endeavour to teach our students proper English expression so that they can communicate effectively and accurately with other members of the scientific community.

It may be that scientists, for whom the communication of information with precision is essential, may eventually become the principal custodians of the purity of the English language.

C u nxt vol, bro!!

Dudley Creagh

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Vice President's Report, Australasia

Christopher T. Chantler

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It is a pleasure to give my first report as Vice President, Australasia. The IRPS is healthy and has several meetings to look forward to in general at the back of the bulletin; but there is significant activity centred around Melbourne and the Australian Synchrotron, and OPAL in Sydney.

1.
We have our major International Symposium for Radiation Physics in September, 2009, 21st-25th September in Melbourne. We have local organizing committees, scientific program committees and professional conference organisers set up, with a preliminary website on-line as we speak. [See the early announcement and poster this issue.] The conference should appeal to all and do make the trip to Australia as we hope to do just as well as the wonderful conference in Coimbra. Some of the details are taking shape well, and we should give another report later, but the workshop should be of particular interest.

While we do not have the grand old architecture or fantastic port of Coimbra, we have heritage and modern buildings, but perhaps more particularly unique animals, scenery, interesting shopping, art galleries, exhibitions, concerts, opera, ballet and museums of note. If you look carefully you can find my family in the art gallery!

It is a great opportunity to 'spend an extra week'and see the southern coast, the Twelve Apostles (though some have been martyred by the sea!), Phillip Island penguins, seals, as well as the more expected Australian flora and fauna. If you have time, the nearby Grampian Mountains to the west of Melbourne offers cottages, hikes, climbs, night-time marsupial walks and brilliant scenery.

To the South lies Tasmania, a beautiful island where you can sleep amongst the Tasmanian devils [we did that about a year ago] or eat specialty produce, or investigate caves or parks. If you are around for a bit longer, or are concerned about exchange rates, do note that the Synchrotron Radiation Instrumentation meeting has been deliberately scheduled for the week following ISRP-11 [in Melbourne too] so you can justify killing two birds with one stone!

Great seafood, restaurants of every cuisine, and strong multi-cultural traditions abound. In every direction, there are parks and wineries. Some of you may be familiar with Australian wines exported around the world. They are good, of course; but the best wines, liquors and fortified beverages (Tokay/ports) [outside Portugal, of course!] are not exported from Australia but are bought only from the Cellar Doors of the individual wineries.

2.
We also have the new Australian Synchrotron (3 GeV, 216 m circumference, 12 straights, 200 mA), ready for business and applications. Right now some of the beamlines are close to full operational status, some are receiving friendly users, some are still being installed. While much of our membership knows the odd synchrotron or two, this will have some beamlines which will be unique, and the ring specification is advanced. We will have a tour of this in the program.

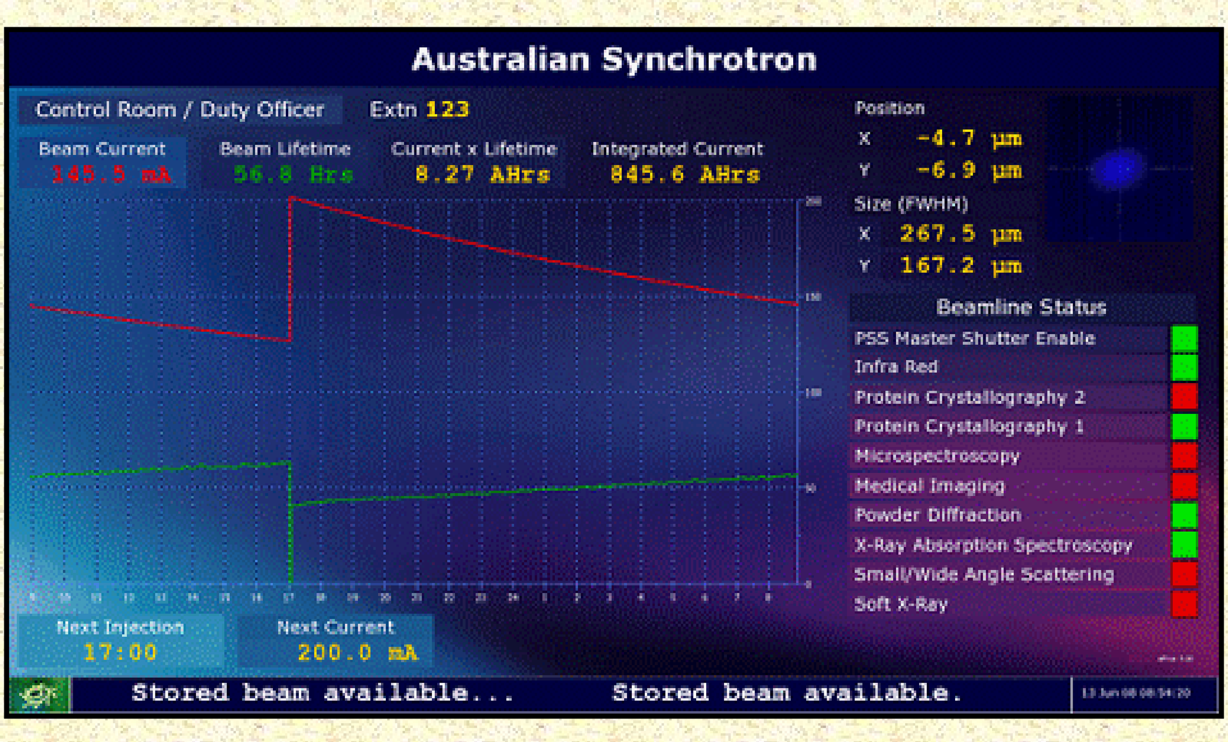

Figure 1 : Courtesy of the Australian Synchrotron website

Current proposal applications are available [http://www.synchrotron.vic.gov.au] for beamtime on :

* Infra Red Microscope and High Resolution Far-IR

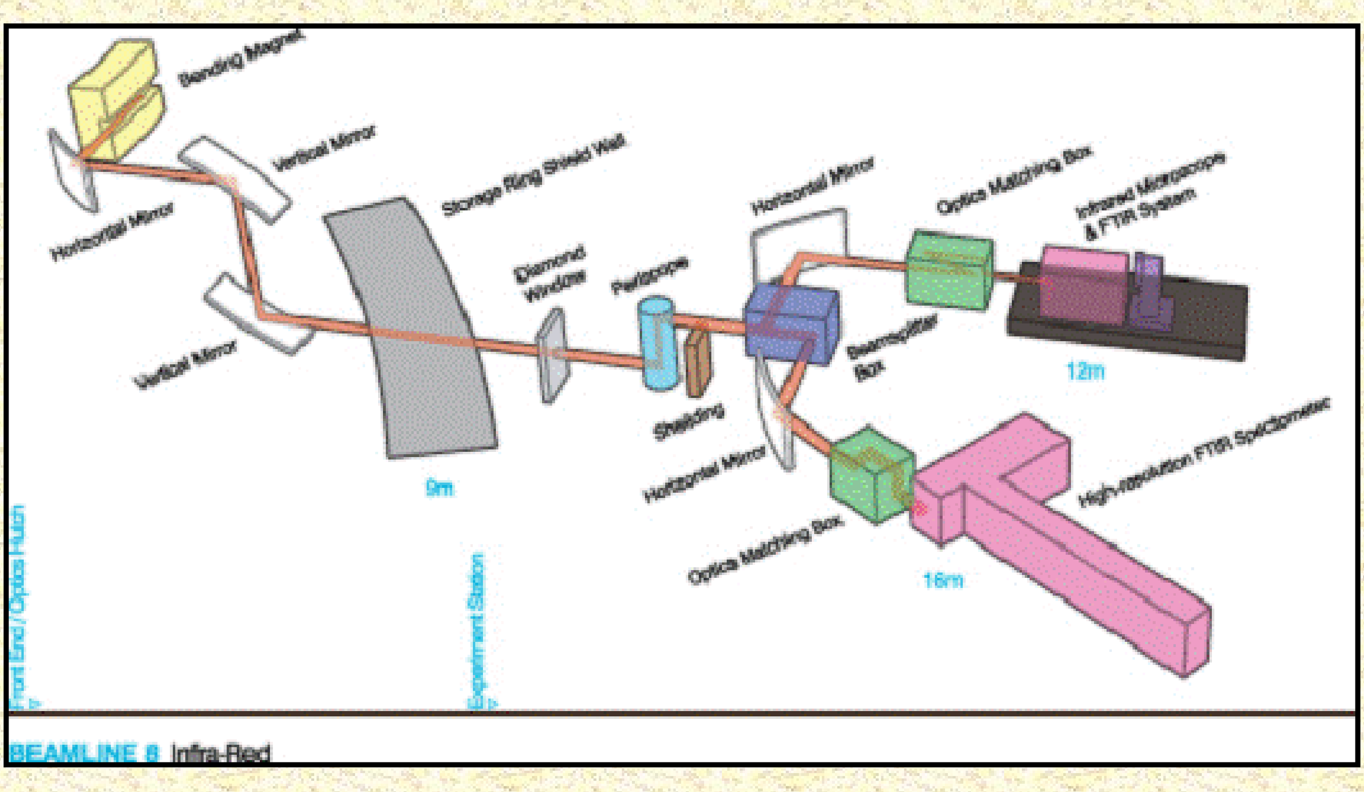

Figure 2 : Courtesy of the Australian Synchrotron website

* Protein Crystallography
* Powder Diffraction
* Soft x-ray Spectroscopy.

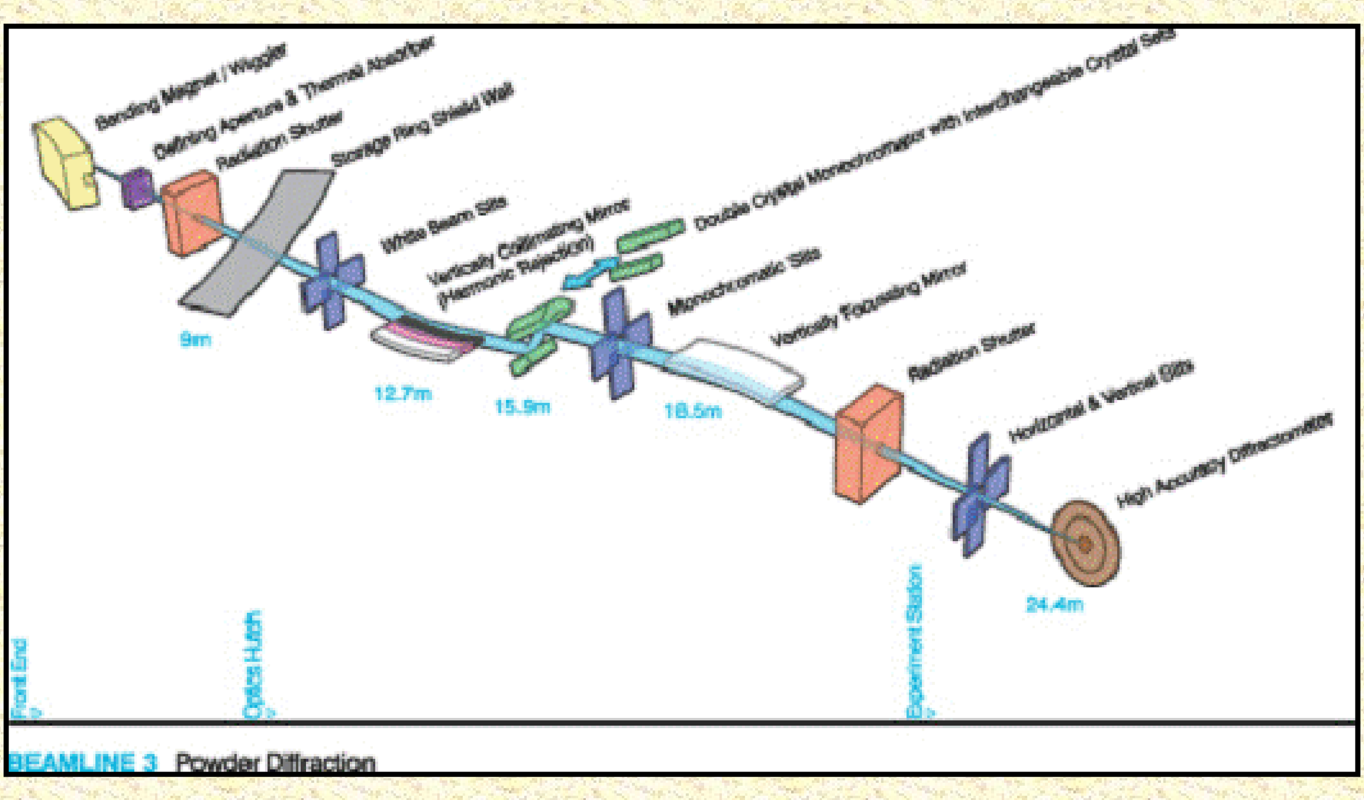

Figure 3 : Courtesy of the Australian Synchrotron website

XAFS is coming possibly by the time of the conference. I ran a 'friendly user' experiment at the new Powder Diffraction line [4 kev to 37 keV, 10^-4 energy resolution] last month. The data quality and statistics were excellent, and the particular experiment on determining new standards appears to have been a complete success, thanks to the local staff and especially Kia Wallwork. Our society president,
Dudley Creagh, is on several advisory committees, and has engineered much of the success of the Infra-red beamline [0.4 micron to advisory committee for a beamline in proposal/preparation, and on successful grant applications involving three other beamlines.

Beamlines Under Construction/Commissioning

Protein Micro-crystal and Small Molecule
X-ray Diffraction
Small and Wide Angle Scattering
Microspectroscopy
Imaging and Therapy

Proposed Beamlines

Vacuum Ultraviolet Spectroscopy
Microdiffraction and Fluorescence Probe
Circular Dichroism
Lithography

So some of the developments augur well for the future. Funding is of course always an issue – we saw some comments from Malcolm Cooper and Bill Dunn in recent issues about the UK and North America.

In Australia, the synchrotron is underfunded to date, but is still coming along well. As opposed to the 'Big Science' clans of North America and the UK, funding major facilities is a novelty for Australia and we are probably all learning the rules. However, our recent successes prove the possibilities. Funding for junior and intermediate researchers in the Australian Research Council schemes is also a difficult process with long odds. The Name of a Professor is sometimes a more important item than the publication record or the proposed science. Again, there are notable successes – it is just the low statistical probabilities that sometimes give pause for some inspired post-doctoral researchers. Australia is undergoing some flux with the new government but we can hope for the best for the future.

3.
Meanwhile Australia's nuclear reactor, OPAL, in Sydney, has been developing well. OPAL is an open-pool type 20 MW research reactor fuelled by low-enriched uranium fuel.

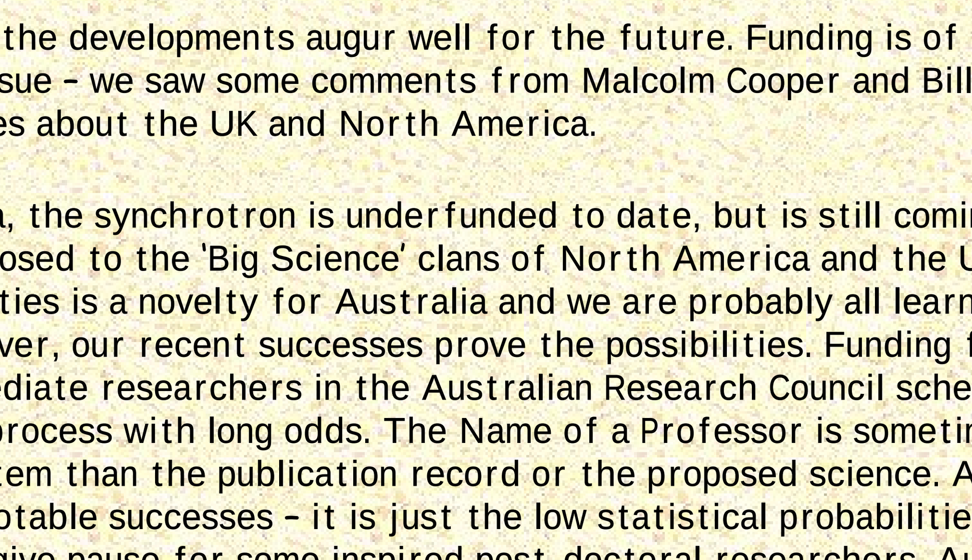

Figure 4 : Courtesy of the Opal website

OPAL is designed to achieve high performance in the production of neutrons. These neutrons are used for the production of radioisotopes, other radiation services and neutron research. An average nuclear power reactor runs at around 3 000 megawatts (MW) and uses about 100 000 kg of uranium, whereas OPAL produces just 20 MW with 30 kg of uranium (about 6 kg of Uranium-235).

Advantages of the reactor design include a compact core which maximises neutron production, and a core that is surrounded by a reflector vessel, which enables easy access to irradiation facilities.

The reactor core, consisting of fuel elements and control rods, is contained inside an open pool of demineralised water, which provides both cooling and protection against radiation from the core.

It is a multi-purpose facility for radioisotope production, irradiation services and neutron beam research. All three play key roles in a wide range of applications, from next-generation medicine and nutrition to designing tomorrow's safer, smarter materials.

The reactor has twice the power of its predecessor (HIFAR), between 4 and 10 times the irradiation capability, far superior neutron scattering abilities, and will house some of the most sophisticated measuring instruments in the world. Some issues have been addressed over the last two years with some significant downtime, but the staff and beamline tools and diagnostics appear to look towards some excellent future experiments. Rescheduling of the research timetable should have happened by the time the reactor reaches full power again in June 2008.

4.
We are hosting an International Forum on Future Directions in Atomic and Condensed Matter Research and Applications, and Council Meeting, this September Monday 22nd to Wednesday 24th in the School of Physics, University of Melbourne. Details of this Forum are given on page 14. The international program is full, and the invited plenaries are listed; but this should help to pave the way for the ISRP-11 the following year.

So these are quite busy times in Australasia, and there is much to look forward to.

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Application of a Monte Carlo Code to a Problem in Radiation Physics

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This is yet another article in a series of articles describing several widely-used Monte Carlo codes and their application. To this point, we have discussed these codes in general terms, in terms of their capabilities and in terms of the data that they use. Here we turn specific and discuss the application of one particular Monte Carlo code to a problem in radiation physics. We will discuss other Monte Carlo codes and apply them to the same problem in subsequent articles.

The problem that serves as an example for the next few articles is the modeling of spectra from x-ray tubes. This problem by no means spans the space of problems of interest in radiation physics. However, it does serve as an interesting test of the electron transport and of the low-energy photon physics in the codes that will be investigated. Here we model a tube with an accelerating potentials of 150 keV.

The code used to generate the results in this article is EGSnrc. EGSnrc is the most modern member of the electron-gamma shower (EGS) family of codes. The EGS code was originally developed at the Stanford Linear Accelerator Center (SLAC). EGSnrc is still being actively developed by the National Research Council of Canada (NRCC). There are many advantages to using EGSnrc over EGS4, the most recent version of the SLAC code. Here we chose EGSnrc because of the low-energy physics improvements available in EGSnrc that are not found in EGS4. Another reason relates to the fact that both EGS4 and EGSnrc are physics packages that require the user to write routines describing the geometry of the problem being considered. Most users, however, try to find geometry packages written by others that will match their problem. EGSnrc has a fairly sophisticated package for modeling accelerators, the BEAM front end to EGSnrc.

The first step that one must take is getting and installing the code package. The home page for the code is located at http://www.irs.inms.nrc.ca/EGSnrc/EGSnrc.html . This is yet another article in a series of articles describing several widely-used Monte Carlo codes and their application. To this point, we have discussed these codes in general terms, in terms of their capabilities and in terms of the data that they use. Here we turn specific and discuss the application of one particular Monte Carlo code to a problem in radiation physics. We will discuss other Monte Carlo codes and apply them to the same problem in subsequent articles.

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There are a number of links on the left side of the page, including a link to the download site of the official version of the code. The user should explore the other links on this page to delve into some of the extensive knowledge base (papers, documentation, forum …) about the code. Clicking on the download link, one finds that there are three methods for installing the code. One should pick the appropriate method based on whether the code is being installed on a Windows machine, on a linux machine or on a Macintosh. The user should read the licensing agreement and, upon accepting it, download the code and install it. EGS makes extensive use of environment variables to simplify pathnames. These need to be properly set before using the code. The output of the installation process will indicate how to do this.

The home page of the BEAM code, accessible from the EGSnrc home page, is

http://www.irs.inms.nrc.ca/BEAM/beamhome.html.

There is a link to the distribution of the code on this page as well as to papers about the code and code documentation. The installation process is platform dependent and, as in the case of EGSnrc, is well-documented on the site and results in the definition of additional environment variables.

After downloading and installing the codes, one needs to generate an executable code specific to the problem under consideration. It is useful to do this using the beam_gui code. Using the parlance of the BEAM code, one is building an accelerator. Basically, this step consists of specifying which component modules will be linked to the main body of the code and will be available to the user. The component modules represent the geometry of the problem and there are a number of them. While each one is intended to represent a particular component found in accelerators, they can be quite flexible and serve multiple uses. In the example considered here, the two component modules chosen were "xtubes" and "slabs". "xtubes" represents the tilted target and "slabs" was chosen for the exit window and filtration. Input for the accelerator must be provided. This input consists of the geometric and material details that represent the physical device. In addition to these details, the user must specify the library containing the radiation physics interaction data that will be sampled by the code. In this example, 521icru.egsdat was chosen. The other data library distributed with the code is 700icru.egsdat. These two libraries contain data for the same materials. The main differences between the two are transport cutoffs. The 521icru data library contains better low-energy data than 700icru. However, choosing 521icru may result in substantially longer runtimes. If a material relevant to your problem is not available in these data libraries, it can be constructed

using the pegs code distributed with egsnrc. There are many inputs required to develop a detailed model of a device. Some require familiarity with typical Monte Carlo terminology. If one is asked to specify a variable and doesn't know what the variable means, the beam_gui has a question mark button next to each variable that will provide a brief description of the variable. More details can be found in scientific papers or by searching on the internet. The final preparatory step is to compile the accelerator, an option of the "execute" menu of the beam_gui.

The x-ray tube modeled here is shown in ***Figure 1***. The beam of 150 keV electrons strikes the tungsten target from the right, creating photons. The photons, tallied in the simulation, exit through the nickel filter at the bottom of the image.

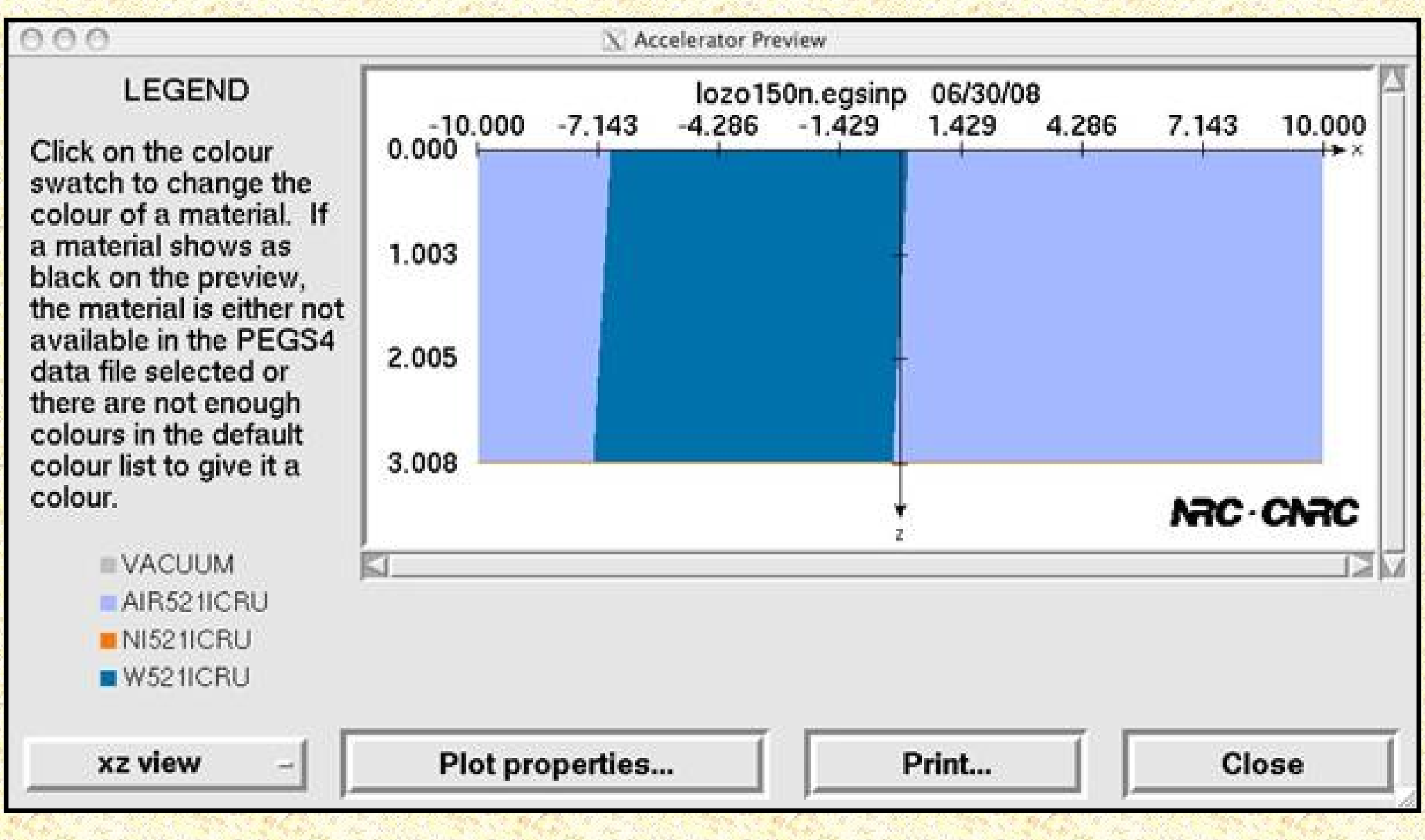

Figure 1: Preview of the x-ray tube modeled here.

Once the x-ray tube has been compiled and once all input parameters have been specified, the remaining step is to run the simulation. One of the input parameters, the number of incident particles, determines the statistical fluctuations of the desired results. The desired precision can be obtained after a trial run by determining the ratio of the desired statistics to those obtained during the trial run and by multiplying the number of particles in the trial run by the square of this ratio.

Figure 2 shows the desired output of the simulation run here, the spectrum of the 150 keV x-ray tube. The spectrum's shape looks to be quite reasonable. Few photons are produced at 150 keV, the hard-photon endpoint. As the energy gets smaller, more and more photons are produced, representing the behavior of the bremsstrahlung process. Two K lines are superimposed on this continuum background. At still lower energies, the self-absorption diminished the number of photons.

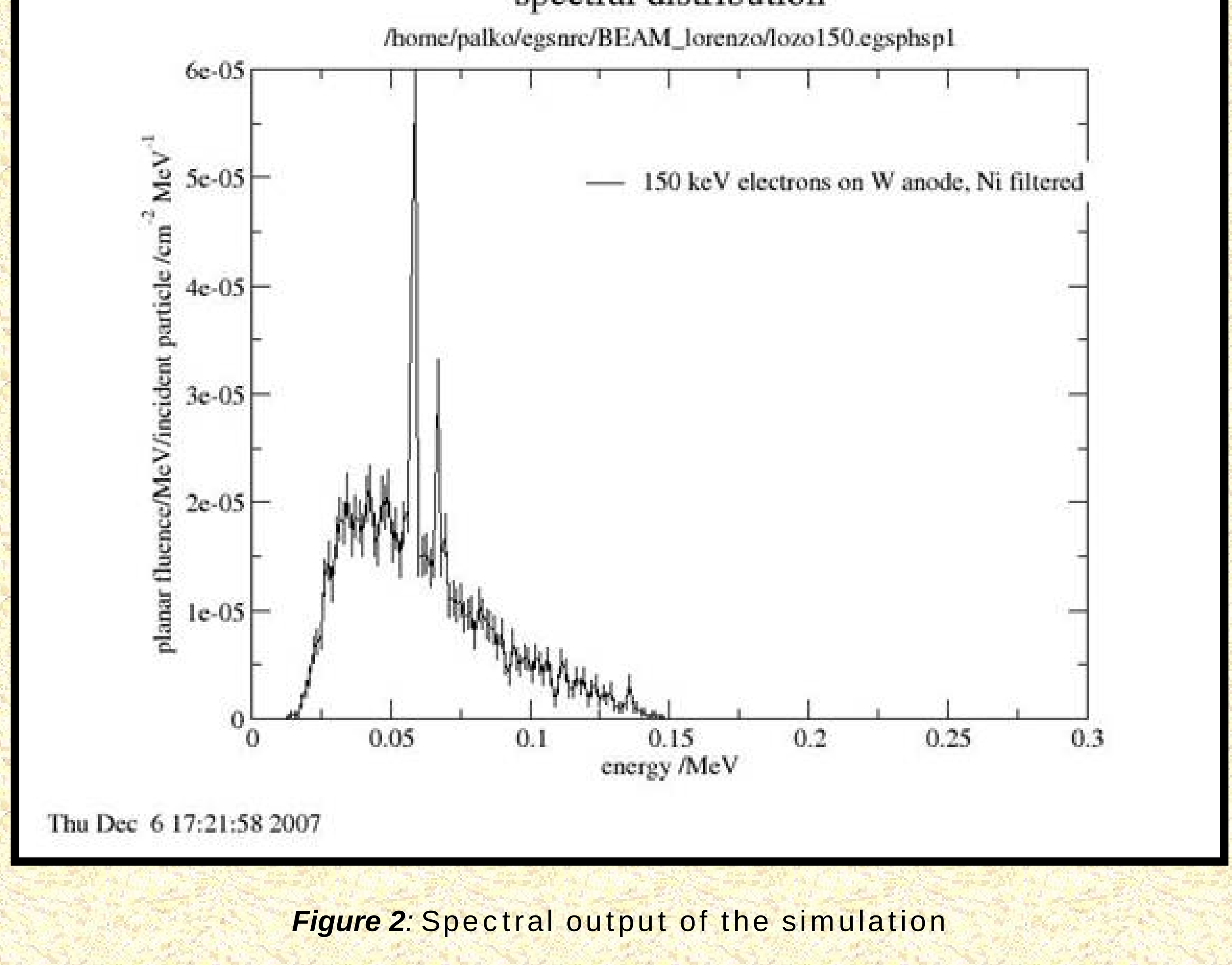

Figure 2: Spectral output of the simulation

Of course, the results of the simulation should be benchmarked against measurements to develop confidence in the code. Since this is a series of articles on Monte Carlo codes, we do not present such data here. In the next article of this series, the PENELOPE code will be used to model the same system and the results will be compared.

* * * * * * * * *

Physicists Lead the Establishment of a Novel Research Institution in Cyprus for the Middle East

Constantia Alexandrou

Professor of Physics at the University of Cyprus and Ex-Vice Chair of the Interim Governing Board of the Cyprus Institute

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Cyprus appears on most global maps, if at all, as a small dot off the cost of Lebanon. Can Cyprus nevertheless offer a fertile environment for the development of a word-class educational and research institution serving the entire Eastern Mediterranean region, one that would educate future regional leaders to more eagerly use science, technology and management instead of the threat of war to respond to scarcity, tap diversity, and resolve conflict? This aspiration is being put to test, largely through the involvement of the international scientific community, via the recent establishment of the Cyprus Institute (www.cyi.ac.cy).

The initial spark came in 1992 with the establishment of the University of Cyprus (www.ucy.ac.cy). The academics that came to work there had pursued careers mostly in the US or Western Europe, with the Physics Department, established in 1999, being no exception. Difficulties were associated with the lack of academic and research tradition, and with the inhomogeneity of the faculty coming from different backgrounds.

Nevertheless, fifteen years after the admittance of its first students, the University of Cyprus has established itself as the highest center for learning serving local educational needs. Whether it can become a regional, or even a world-class, institution is problematic for a number of reasons, ranging from governance structures that do not reward excellence to the lack of innovation culture in the surrounding society. These are features common in this geographical area of the world that hinder the emergence of worldclass institutions. According to the ***Times*** magazine list (November 5, 2004 issue) of the top 200 universities worldwide, none are from this area, with two from Israel being the only exceptions.

When Cyprus entered the European Union (EU) in 2004, it held the embarrassingly last position in funds spent on research per capita. The government reacted with increasing spending on research thereby becoming the fastest growing in the EU for the last four years. The impact is becoming visible : two additional public universities and three private ones have been established and funding for research is rising steadily. Cyprus is doing very well in claiming competitive research funds from EU and, in the recent highly competitive European Research Council call, Cyprus emerged as a champion. Education, research, and innovation have become top priorities for all political parties. This is fortunate since political and social unity on such issues can drive R&D, as was seen in the case of Finland and Ireland, a decade ago.

The proposal that articulated the vision for the Cyprus Institute was developed by a five-member committee that included three physicists: E. J. Moniz of MIT, C. N. Papanicolas of the University of Athens and H. Schopper of CERN. The other two were F. Rhodes and G. Ourisson former Presidents of Cornell and Louis Pasteur Universities respectively. The proposal was debated and enthusiastically endorsed in 2002 by a convocation of international scholars that included many prominent academics, among them scientists of the stature of the late H. Curien, H. Varmus, P. Crutzen and J. Sachs. These scholars came with the belief that Cyprus at the cross-roads of Western and Eastern civilizations, in an area of long political strife, and with good relations with both Israel and the Arab world, holds the promise to become Europe's gateway to the East, playing a catalytic role for new understanding and reconciliation among the nations of the region. They endorsed the creation of a novel, technologically oriented world-class Institute based in Cyprus but serving the entire region.

The Cyprus Institute, a private non-profit organization, is to be structured ab initio to facilitate learning across disciplinary boundaries, to transcend national borders, applying the best of science, technology, and management to deal with some of the world's most refractory problems. The first indications regarding the development of the Institute seem excellent: The first Research Center of the Institute, on Energy, Environment and Water Resources, developed with public funding in partnership with MIT, was inaugurated on the 10th of December 2007 by the President of the Republic. The second Research Center on Technology in Archeology is being developed in partnership with the Louvre and the third on Computation-based Science and Technology with the University of Illinois. The involvement of the international community in the realization of the Institute remains strong, as exemplified by the Chair of its Board of Trustees, physicist E. Brézin of École Normale Supérieure and ex-President of the French Academy of Sciences. The project also finds strong support from local academics, including the majority of the physics community because of a convergence of mutual aspirations : to transform Cyprus into a research-oriented society and help establish world-class research in this part of the world.

There are positive developments in neighboring countries. Perhaps the most notable example is SESAME (www.sesame.org.jo), an international synchrotron light source facility being built in Jordan under the auspices of UNESCO. Cyprus, like many other countries in the region, regards SESAME as a great opportunity to accomplish in the Middle East what CERN did in postwar Europe. The last Council meeting of SESAME, held in Cyprus in December 2007, explored and endorsed close co-operation between the Cyprus Institute and SESAME, noting the common aspirations that drive the development of both institutions.

This is just the beginning of a long and difficult path. Continuous support from the international community is crucial. Working together with countries in the region to build research infrastructure of the highest caliber, establishing international norms and openness will be a key element. It is indeed a challenge for Cyprus and the other countries in the region to establish a research environment that resembles that of countries where world-class institutions can flourish with all the positive aspects that this will bring to their people.

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Conference Information

ISRP - 11

11th International Symposium on Radiation Physics

University of Melbourne, Victoria, Australia

21st - 27th September, 2009

The 11th International Symposium on Radiation Physics (ISRP-11) will be held at the University of Melbourne, Victoria, Australia, 21st -25th September 2009. This event is organized by the International Radiation Physics Society (IRPS) and is supported by DEST, the Australian Synchrotron and the Victorian Government. The meeting is devoted to current trends in radiation physics research. The symposium in Melbourne will be the latest in a series of triennial symposia. A 2½ day Workshop will also be held 25th - 27th September.

SYMPOSIUM SCIENTIFIC TOPICS

The ISRP-11 will consist of both oral and poster sessions. The oral sessions will include invited and contributed papers. The latter will be selected by the Scientific Programme Committee amongst the poster submissions whose authors indicate their preference for oral presentation. A prize for the best young researcher paper presented orally will be given. The presentations will cover developments and applications of radiation physics encompassing, but not limited to:

A. Processes in radiation physics
B. Quantitative X-ray and particle analytical techniques
C. Absorption and fluorescence spectroscopy (XAFS, XANES, Raman)
D. Sources and detectors and simulation of radiation transport
E. Materials Science and applications to minerals, mining and processing
F. Medical therapeutics and biology
G. Applications to space, earth and environmental sciences
H. Cultural heritage and art
I. New technologies and industrial applications

../Continued

ISRP-11 Conference Information (Continued)

It will include fundamental and applied topics, and will be a great opportunity to see the new Australian Synchrotron in action!

The symposium is coordinated by an International Advisory Board, a Symposium Organising Committee, and a Scientific Program Committee.

Members of the Scientific Program Committee include:

Chris Chantler [School of Physics, University of Melbourne, Australia], Chair

Larry T. Hudson [National Institute for Standards and Technology, Gaithersburg, USA], Co-Chair

Isabel Lopes [University of Coimbra, Portugal]

Dudley Creagh [University of Canberra, Australia]

Chris Ryan [CSIRO, Victoria, Australia]

Stephen Best [Chemistry, University of Melbourne, Australia]

Richard Pratt [University of Pittsburgh, USA]

Malcolm Cooper [University of Warwick, UK]

David Bradley [University of Surrey, UK]

Jorge Fernández [University of Bologna, Italy]

The Symposium Organising Committee includes

Chris Chantler [School of Physics, University of Melbourne, Australia], Chair

Dudley Creagh [University of Canberra, Australia]

Justin Kimpton [University of Melbourne, Australia], Secretary

Stephen Best [Chemistry, University of Melbourne, Australia], Treasurer

Ian Madsen [CSIRO, Victoria, Australia]

Chris Ryan [CSIRO, Victoria, Australia]

Chanh Tran [La Trobe University, Victoria, Australia]

Ned Blagojevic [ANSTO, NSW, Australia]

Weihua Liu [CSIRO, Victoria, Australia]

Stacey Borg [CSIRO, Victoria, Australia]

Barbara Etschmann [Museum, SA, Australia]

PROCEEDINGS

The proceedings of the ISRP-11 will be published in a fully-refereed journal.

MORE INFORMATION

Please visit the ISRP-11 web site at

www.ph.unimelb.edu.au/xenq/ISRP11/ISRP11.php

ISRP-11

11th International Symposium on Radiation and Physics

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Australian Synchrotron

SYMPOSIUM SCIENTIFIC TOPICS

The ISRP-11 will consist of both oral and poster sessions. The oral sessions will include invited and contributed papers. The latter will be selected by the Scientific Programme Committee amongst the poster submissions whose authors indicate their preference for oral presentation. A prize for the best young researcher paper presented orally will be given. The presentations will cover developments and applications of radiation physics encompassing, but not limited to:

A. Processes in radiation physics
B. Quantitative X-ray and particle analytical techniques
C. Absorption and fluorescence spectroscopy (XAFS, XANES, Raman ...)
D. Sources and detectors and simulation of radiation transport
E. Materials Science and applications to minerals, mining and processing
F. Medical therapeutics and biology
G. Applications to space, earth and environmental sciences
H. Cultural heritage and art
I. New technologies and industrial applications

It will include fundamental and applied topics, and will be a great opportunity to see the new Australian Synchrotron in action!

The symposium is coordinated by an International Advisory Board, a Symposium Organising Committee, and a Scientific Program Committee.

PROCEEDINGS: The proceedings of the ISRP-11 will be published in a fully-refereed journal.

MORE INFORMATION: Please visit the ISRP-11 web site at **www.ph.unimelb.edu.au/xenq/ISRP11/ISRP11.php**

Members of the Scientific Program Committee include:

Chris Chantler [School of Physics, University of Melbourne], Chair
Larry T. Hudson [National Institute for Standards and Technology, Gaithersburg], Co-Chair
Isabel Lopes [University of Coimbra, Portugal]
Dudley Creagh [University of Canberra, Australia]
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Stephen Best [Chemistry, University of Melbourne]
Richard Pratt [University of Pittsburgh, USA]
Malcolm Cooper [University of Warwick, UK]
David Bradley [University of Surrey, UK]
Jorge Fernández [University of Bologna, Italy]

The Symposium Organising Committee includes:

Chris Chantler [School of Physics, University of Melbourne], Chair
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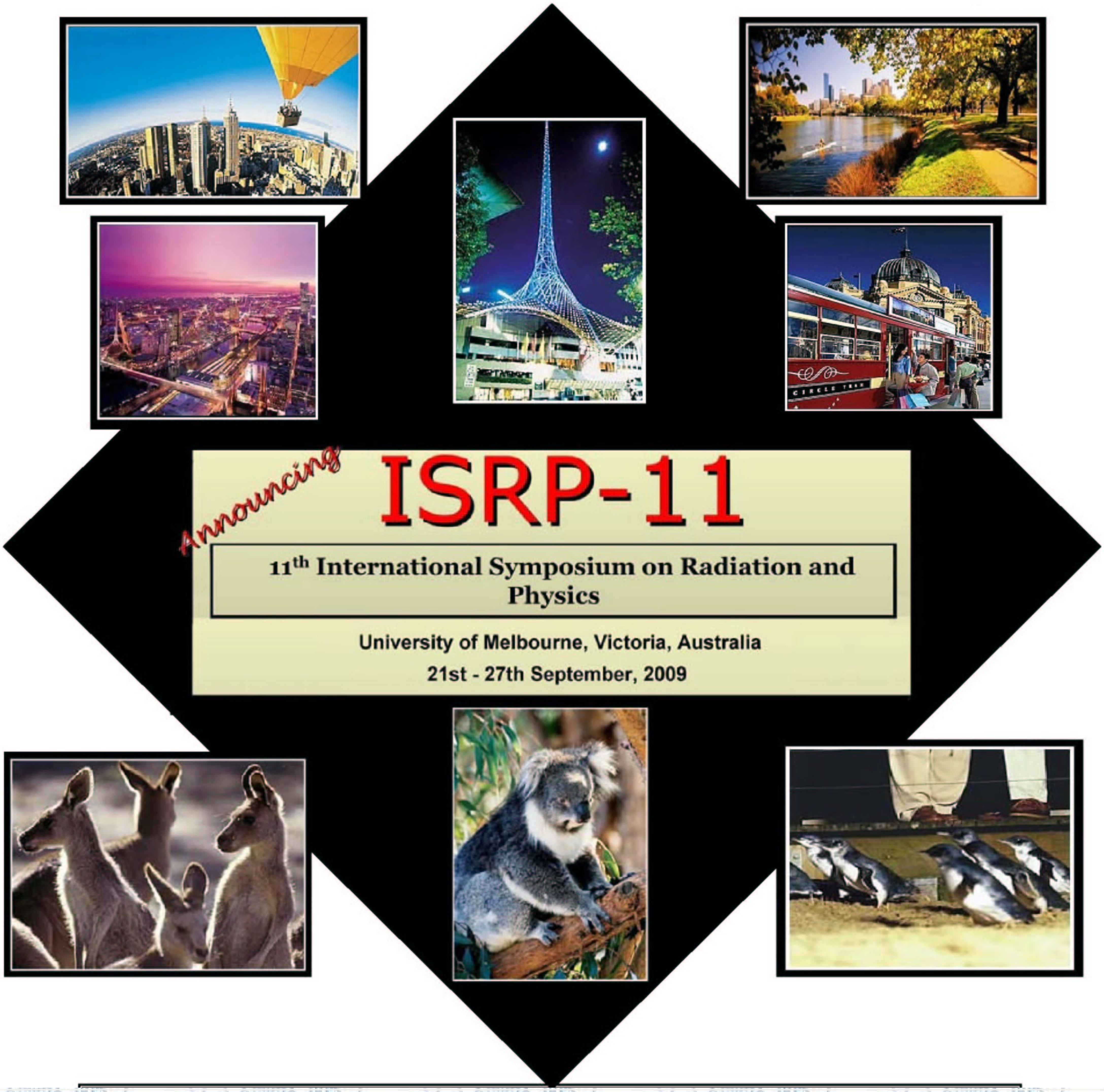

Photos from ISRP-11 poster

courtesy of Chris Chantler and Justin Kimpton

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