
Radiation Safety Information Computational Center



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Whoever in trouble and sorrow needs your help, give it to him. Whoever in anxiety or fear needs your friendship, give it to him. It isn't important whether he likes you. It isn't important whether you approve of his conduct. It isn't important what his creed or nationality may be. —E. N. West, D.D.

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CHANGES TO THE RSICC CODE AND DATA COLLECTION

[CCC-778/PHITS 2.24](#)

PHITS 2.24 was contributed by the Research Organization for Information Science and Technology, Tokai, Ibaraki, Japan, Japan Atomic Energy Agency, Tokai, Ibaraki, Japan, High Energy Accelerator Research Organization (KEK), Tsukuba, Ibaraki, Japan, and Chalmers University of Technology, Gothenburg, Sweden, through the OECD NEA Data Bank, Issy-les-Moulineaux, France. PHITS2 can deal with the transport of all particles (nucleons, nuclei, mesons, photons, and electrons) over wide energy ranges, using several nuclear reaction models and nuclear data libraries. Geometrical configuration of the simulation can be set with general geometry (GG) or combinatorial geometry (CG). Various quantities such as heat deposition, track length and production yields can be deduced from the simulation, using implemented estimator functions called “tally.” The code also has a function to draw 2D and 3D figures of the calculated results as well as the setup geometries, using the code ANGEL.

The package is transmitted on a CD including the referenced documents, example problems and source files. Fortran77; Windows and Linux Operating Systems (C778MNYCP00).

PSR-405/SAPHIRE

SAPHIRE: Systems Analysis Programs for Hands-On Integrated Reliability Evaluations. Version 7.27 was contributed by Idaho National Engineering & Environmental Laboratory, Idaho Falls, Idaho. SAPHIRE can be used to model a plant's response to initiating events, quantify core damage frequencies, and identify important contributors to core damage (Level 1 PRA). The program can also be used to evaluate containment failure and release models for severe accident conditions, given that core damage has occurred (Level 2 PRA). In so doing, the analyst could build the PRA model assuming that the reactor is initially at full power, low power, or shutdown. In addition, SAPHIRE can be used to analyze both internal and external events, and it includes special features for transforming models built for internal event analysis to models for external event analysis. It can also be used in a limited manner to quantify the frequency of release consequences (Level 3 PRA). Because this software is a very detailed technical tool, users should be familiar with PRA concepts and methods used to perform such analyses.

The package includes one self-extracting executable containing precompiled executable for Windows systems, sample problem input and documentation (P00405PCX8605).

Obituary

William "Bill" Claude Hopkins died Tuesday, April 26, 2011, in Lexington, KY. Bill was born July 9, 1945, in Pikeville, KY, the son of the late William Chapman Hopkins and Deane W. Hopkins. Bill received a Bachelor of Science degree in Mechanical Engineering from the University of Kentucky and his Master of Science degree in Nuclear Engineering from North Carolina State University. He enjoyed a thirty year professional career in the field of nuclear engineering with the Bechtel Group, Inc.

Bill joined ANS as a student in 1967 and became active in standards in 1975. He chaired several working groups and helped initiate and direct many standards. In 1991 he took over as ANS-6 Subcommittee Chair and ex officio member of the N17 Committee. Bill also served the Society as a member of the ANS Standards Steering Committee (now the ANS Standards Board).

Bill was an original member and technical adviser of Bechtel's Three Mile Island team that planned the decontamination and recovery of Three Mile Island's Unit 2. He also served on a joint U.S. Department of Energy/Russian task force to examine replacement options for the two Russian weapons production reactors at Chernobyl. He was particularly interested in introducing the field of engineering to a new generation of students. As such, he was president and a member of the board of directors of the Junior Engineering Technical Society, a national non-profit education organization that has served the pre-college engineering community for over 50 years. After retirement, Bill found his passion as a member and leader of the lay volunteer Stephen Ministry, where his faithful involvement and caring heart was a motivating presence in maintaining the Lexington area-wide Stephen Ministry network. Bill loved bluegrass music and was influential in obtaining a University of Kentucky Honorary Doctorate of Letters for Bill Monroe, a Kentucky native, also known as the Father of Bluegrass. Bill will be missed greatly by those who came to love, admire, and appreciate him. In lieu of flowers, memorial gifts may be made to the UK College of Engineering, 253 Ralph G. Anderson Building, University of Kentucky, Lexington, KY 40506-0503, or to the St. Luke United Methodist Church, 2351 Alumni Drive, Lexington, KY 40517-4102. If you wish to send a card to his wife, Susan, and daughter, Mary, the address is 1764 Bahama Road, Lexington, KY 40509-9504.

ORNL Seeking Grads

Are you graduating soon with a Master's degree or Ph.D. in a science, technology, engineering, or math (STEM) field? Do you serve as the faculty advisor for graduate students? Oak Ridge National Laboratory currently has over 100 openings in our Postdoc and Post-Masters Research Associates Program. The Program is open to recent Ph.D. and Masters graduates (within 5 years of graduation) who are interested in gaining experience at a national laboratory. Appointments in the program are for 1 year with the possibility of renewal for up to 3 additional years. Selected individuals receive a competitive salary, relocation assistance, benefits, and if needed immigration work authorization (H1B for themselves and H4 for family members).

Each position in the program is project specific. We invite you to search the current list of openings at <http://www.ornl.gov/ornl/postdocs/ornl-pd-pm/default.aspx>, which is searchable by keyword. Each posting will include detailed qualifications and application information. Most of the positions are open to non-US citizens. Citizenship restrictions will be listed in the posting.

You can watch a short video (6 mins) on YouTube about the educational opportunities available at ORNL: <http://ow.ly/2EQLz>. We also invite you to fan our Facebook Page to stay up to date with upcoming program deadlines and announcements: Science Education Programs at Oak Ridge National Laboratory (<http://www.facebook.com/pages/Science-Education-Programs-at-Oak-Ridge-National-Laboratory/108317825885086>).

How to Apply: Once you have identified the position(s) in which you are interested, apply online at https://www2.ornl.gov/ORNL_POST/. All applicants will need to register before they can begin the online application.

All information is available online; if you have trouble viewing it contact ornledu@ornl.gov.

The Science Education Programs at Oak Ridge National Laboratory are managed by Oak Ridge Associated Universities (ORAU) through the Oak Ridge Institute for Science and Education (ORISE).

Based on information provided by *ORISE*.

CONFERENCES, COURSES, SYMPOSIA

RSICC attempts to keep its users and contributors advised of conferences, courses, and symposia in the field of radiation protection, transport, and shielding through this section of the newsletter. Should you be involved in the planning/organization of such events, feel free to send your announcements and calls for papers via email to riceaf@ornl.gov with "conferences" in the subject line by the 20th of each month. Please include the announcement in its native format as an attachment to the message. If the meeting is on a website, please include the url.

Every attempt is made to ensure that the links provided in the Conference and Calendar sections of this newsletter are correct and live. However, the very nature of the web creates the possibility that the links may become unavailable. In that case, please call or mail the contact provided.

TRAINING

MCNPX and Visual Editor Training

Classes are taught using the most recent (beta) version of the Visual Editor Code. All class attendees must have a valid MCNP/MCNPX RSICC license. Bring proof of receipt (letter or email) to the class.

<u>2011 Classes for Visual Editor</u>		
July 4–8	Introduction to MCNP using the MCNPX Visual Editor	Barcelona, Spain
September 12–16	Introduction to MCNP using the MCNPX Visual Editor	Myrtle Beach, SC
September 19–23	Intermediate MCNP Visual Editor with a special emphasis on tallies and variance reduction	Myrtle Beach, SC
October 17–21	Introduction to MCNP using the MCNPX Visual Editor	Las Vegas, NV
October 24–28	Intermediate MCNP Visual Editor with a special emphasis on tallies and variance reduction	Las Vegas, NV
November 14–18	Intermediate MCNP Visual Editor with a special emphasis on tallies and variance reduction	London, UK

The introductory workshops combine teaching on MCNP basics and how to create MCNP input files using the Visual Editor. The intermediate Visual Editor workshops focus on more advanced topics such as tallies and variance reduction using the Visual Editor.

Exercises will focus on creating input files and visualizing output data with the Visual Editor. Attendees are encouraged to bring their own input files for viewing and modifying in the visual editor; this is particularly important for the intermediate workshop.

The course description and registration information can be found at <http://www.mcnpvised.com/index.html>.

<u>2011 Classes for MCNPX</u>		
June 27–July 1	MCNPX Intermediate Workshop	Barcelona, Spain
September 26–30	MCNPX Intermediate Workshop	Washington, DC
November 7–11	MCNPX Intermediate Workshop	London, U.K.
<u>2012 Classes</u>		
January 9–13	MCNPX Intermediate Workshop	Las Vegas, NV

The MCNPX team at Los Alamos National Laboratory offers interactive workshops for training users in the capabilities of MCNPX at the intermediate level.

The list of workshops is tentative, as workshops may be added, removed, or modified throughout the year, depending on user interests. Workshops with fewer than 12 registrants on the early registration date are subject to cancellation or rescheduling.

In order to process non-U.S. citizens by the class date, non-U.S. citizens must register at least 6 weeks prior to the start of the training class. All non-U.S. citizens who reside in countries listed in the U.S. Code of Federal Regulations, Title 10, Part 810.8, are required to register at least 8 weeks prior to the start of the training class. These participants must be processed by the DOE and should not make travel arrangements until approval from DOE has been obtained.

Additional information about the courses can be found at the website, <http://mcnpx.lanl.gov/>. To register send an email to Randy Schwarz at randyschwarz@mcnpvised.com, indicating the workshop of interest to you.

ENEN Courses

The European Nuclear Education Network (ENEN) has provided the following information on upcoming courses.

Neutronics for Light Water Reactors—June 27–July 8, 2011

Principles and Operation of Nuclear Reactors—September 12–23, 2011

Contact: Nadia Nowacki at

The European Nuclear Education Network Association (ENEN)

PO Box 35

Commissariat à l'Energie Atomique / Saclay

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<http://www-instn.cea.fr/>

PENELOPE

A new version of PENELOPE will be presented and used during a course to be held July 4–7, 2011, at the University of Barcelona.

PENELOPE-2011 contains improvements in the description of inelastic collisions of electrons and positrons. The geometry package has been reformulated to permit the description of nanometric structures. Programs for the calculation of mass energy-absorption coefficients for photons, and linear energy transfers for charged particles have been included in the distribution package. The manual has also been revised, and a new chapter on radiation fields and dosimetry has been added.

The syllabus and registration form are available at the following pages: <http://www.oecd-nea.org/dbprog/courses/PENELOPE-syllabus2011.html> and <http://www.oecd-nea.org/dbprog/courses/penelope2011-reg.php>.

Nuclear Reactor Simulation

The Nuclear Research Group of San Piero a Grado (GRNSPG) of the University of Pisa (UNIPi), the Royal Institute of Technology (KTH) and the Innovative Systems Software (ISS) are jointly organizing hands-on trainings in Nuclear Reactor Simulation directed toward beginner and intermediate users of system thermal-hydraulic codes and 3D neutron kinetic coupling. The seminar-trainings will take place July 11–15, 2011, at the Royal Institute of Technology (KTH) in Stockholm (Sweden). It will be held in classrooms equipped with data projectors and networked PCs suitable for running advanced best estimate thermal-hydraulics codes.

The seminar is open to vendors, utilities, regulatory bodies, national laboratories, consulting companies and universities. A minimum of fifteen participants is required to organize the seminar. A maximum of 40 persons will be accepted.

Five different courses consisting of 35 hours each are offered:

- RELAP5-Beginner: This course will provide an overview of the computer codes in deterministic safety analysis, familiarization with the syntax and the input structure of the RELAP5 code and with the use of plotting tools. Hands-on training on simple modeling is provided.
- RELAP5-Intermediate: This course will focus on the features and limitations of system thermal-hydraulic codes and with the procedures for developing nodalizations and qualifying code calculations. Physical models in RELAP5 code will be discussed and hands on training on components and sub-systems models will be provided.
- TRACE-Beginner: This course will provide an overview of the computer codes in deterministic safety analysis, familiarization with the syntax, the input and output structure of the TRACE code, SNAP GUI and the use of post-processing plotting tools. The major part of the course will be spent on hands-on modeling of a PWR reactor.
- PARCS & 3D NK Coupling: This seminar-training is directed toward beginner PARCS users with little or no prior PARCS code experience. The course will provide an overview of the PARCS code and methods, familiarization with the input syntax, and the input and output structure of the code. The course will show the entire process of core modeling, from cross-section generation, input preparation, to coupling with RELAP5 and TRACE and output analysis. The major part of the course will be spent on hands-on modeling of a PWR reactor.
- RELAP5/SCDAPSIM: This seminar training is directed to intermediate to advanced RELAP5 users with basic thermal hydraulics system code experience that would like to learn how to use detailed fuel behaviour and other SCDAP models for a range of reactor designs and transients including severe accident transients. The course will review basic RELAP5 input/output options and modeling approaches, introduce the use of representative fuel assemblies and detailed SCDAP core component models, and introduce representative full plant models with detailed 2 D core nodalization. As an option, the user can run a variety of transients using RELAP/SCDAPSIM/MOD4.0 with integrated uncertainty analysis option and integrated interactive RELSIM graphic user environment.

Further information about participation and registration as well as useful practical information can be obtained from Alessandro Petruzzi at the following email address: a.petruzzi@ing.unipi.it. A website with the latest news will be available after April 1st at: <http://www.grnspg.ing.unipi.it/nrshot>.

Short Courses on Monte Carlo Analysis and Nuclear Criticality Safety

The Department of Nuclear Engineering at the University of Tennessee-Knoxville is offering short courses for radiation transport and criticality safety specialists during Tennessee Industries Week (TIW-46), August 8-12, 2011.

Radiological Assessment—This three-day course is based on selected topics from University of Tennessee courses on Radiological Assessment, Internal Dosimetry, and Uncertainty Analysis, and is intended for personnel working in areas associated with radiological assessment or internal dosimetry. Individuals professionally established in a particular area would benefit from exposure to a number of important topics, and those who are new to this area of science would benefit from the integration of a variety of important and relevant topics.

Fundamentals of nuclear physics, health physics, and internal dosimetry will be presented for review and to establish a common framework for subsequent presentations. Information presented on radionuclide transport and pathways analysis will include basic theory and solutions to several tutorial examples. Descriptions of several computer programs used for internal dosimetry and for radiological assessment will be presented, and details from several studies will be used as examples.

Information on external dosimetry generally follows material in the cited text. Materials presented on internal dosimetry will go beyond the reference text and will involve computational methods as well as

practical examples. Methods for analyzing bioassay program data will be carefully reviewed and case studies will be discussed.

[Nuclear Criticality Safety](#)—Engineers, scientists, and technical managers who wish to increase their knowledge and understanding of nuclear criticality safety will be interested in this intensive one-week short course. The topics covered in the course are based primarily on the experience of the five instructors which totals over 120 years of nuclear criticality safety related experience. Such a wealth of experience needs to be shared with the criticality safety community including both new professionals in the field as well as experienced professionals.

The course topics include illustrative applications using the SCALE system developed at Oak Ridge National Laboratory with emphasis on the Monte Carlo code KENO, standards, regulations, review of accidents, hand calculation methods, subcritical limits, code validation techniques, accident response planning and management, and transient excursion modeling.

[Monte Carlo Analysis](#)—Monte Carlo is often the method of choice to solve complex problems in nuclear criticality safety and radiation shielding. To use Monte Carlo effectively, the analyst must understand the theoretical and computational fundamentals of the method, as well as the computational options available in particular computer tools. Also, it is sometimes advantageous to create new special-purpose Monte Carlo programs to solve particular problems rather than use an existing program. The Monte Carlo course runs for 5 days and has the following objectives:

1. To familiarize the student with the basic concepts of the Monte Carlo method in a general (non-transport) context to add to the ability of the student to apply the Monte Carlo method to a variety of problems in mathematics, physics, and engineering.
2. To familiarize the student with the particular mathematical techniques and probability distributions that are used in analog Monte Carlo solutions of neutral-particle radiation transport problems. This is reinforced through an in-class exercise that develops an analog Monte Carlo code solution to a simple slab transport problem.
3. To familiarize the student with the mathematical basis for variance reduction techniques: non-analog mathematical methods that increase the efficiency of the calculation without biasing the solution. This is reinforced with a continuation of the in-class exercise to incorporate variance reduction techniques.
4. To apply the lessons learned to the most commonly used Monte Carlo code, MCNP. In a series of hands-on exercises with the PC version of MCNP, the novice user will learn to set up simple problems, and all levels of users will gain experience in using the variance reduction techniques offered by the MCNP code.

Special attention will be given to the understanding of the use of adjoint calculations in transport analyses, both as an alternate means of obtaining system responses and as importance functions for accelerating Monte Carlo forward solutions. Advantages and disadvantages of the adjoint mode versus the forward mode of analysis will be described. In addition, the relationship of Monte Carlo methods to deterministic methods will be described, including strategies involving the hybrid use of both methods to more efficiently solve certain transport problems.

[Case Studies in Neutron Transport Theory](#)—The study of the neutron transport equation is a delicate blend of theoretical mathematics, numerical methods and computational strategies describing the interaction of neutrons and nuclei. Not only do we gain physical insight from the solution to the transport equation, but we also create new mathematics and numerical methods for the solution of equations. This short course is offered to those individuals who want to experience the elegance of analytical transport theory and how this theory can impact the development of transport methods for application.

This course will concentrate on transforming theoretical solution representations of the neutron transport equation into numerically useable forms. The course will study reactor physics from neutron slowing down to multidimensional multigroup theory and criticality. Though the backdrop is reactor physics, our emphasis will be on analytical manipulations of the transport equation and the numerical realization of its solutions.

The deadline for registration is **July 22, 2011**. Classes are limited in size and will be filled on a first-come, first-serve basis. For additional information on these and other courses offered during TIW-46, contact Kristin England at the University of Tennessee, phone (865) 974-5048, email kengland@utk.edu, url <http://www.engr.utk.edu/nuclear/TIW.html>.

IAEA Workshop Monte Carlo Radiation Transport and Associated Data Needs for Medical Applications

The International Atomic Energy Agency (IAEA) is offering a 2-week workshop on "Monte Carlo Radiation Transport and Associated Data Needs for Medical Applications," October 17–28, 2011, in Trieste, Italy, at the Abdus Salam International Centre for Theoretical Physics. This workshop will revolve around the EGSnrc and BEAMnrc codes. There is no registration fee associated with attendance at the workshop. Priority will be given to participants from developing countries. The workshop Director is Roberto Capote of the IAEA and the lecturers include Iwan Kawrakow, Ernesto Mainegra-Hing, Frederic Tessier, Blake Walters and David W. O. Rogers. Visit the workshop website at <http://www-nds.iaea.org/MC2011/MC2011.htmlx> for more information, and to download the application form.

CONFERENCES

[International Conference on Transport Theory \(ICTT-22\)](#)

The International Conference on Transport Theory (ICTT-22) will be held September 11–15, 2011, in Portland, Oregon. The conference will bring together researchers in the several fields of engineering and science who use similar - or even identical - mathematical methods in their studies, meaning those which evolved from the Boltzmann transport theory. Possible topics include:

- Kinetic Theory
- Transport Problems in Plasma Physics
- Neutron Transport and Applications to Reactor Physics
- Stochastic Transport Problems - Non Conventional Applications
- Quantum Transport Problem
- Inverse Transport Problems
- Computational Methods
- Radiative Transfer - Fluid-dynamics

The registration page for the meeting is available at <http://ne.oregonstate.edu/ICTT/Registration.htm>. Additional information regarding the program, accommodations, and special events is available at the conference website: <http://ne.oregonstate.edu/ICTT/>.

[ICNC2011](#)

The International Conference on Nuclear Criticality (ICNC2011) which will be held at Heriot-Watt University, Edinburgh, United Kingdom, September 19–22, 2011, allows specialists from around the world to meet to discuss, analyze and study the latest developments in the area of nuclear criticality safety. Complete details on the conference are available at the website, <http://www.informaglobalevents.com>.

[com/event/icnc2011](http://www.inac2011.com/event/icnc2011). For information about registering, delegate information or any other customer service enquiries, please contact Energy Customer Services, Informa UK Ltd., PO Box 406, West Byfleet KT14 6NN UK (phone +44 (0) 20 7017 5518, fax +44 (0) 20 7017 4745, email energycustserv@informa.com).

INAC 2011

The International Nuclear Atlantic Conference (INAC) will convene its 2011 conference October 24–28, 2011, in Belo Horizonte, the capital of the state of Minas Gerais, in the Brazilian Southeast. The theme of the event will be *Nuclear Energy: New Jobs for a Better Life*, which intends to discuss how to prepare young professionals for the opportunities that are surfacing with the renewed investment in the nuclear sector.

The conference will be organized around three independent but complementary technical meetings: The XVII Meeting on Nuclear Reactor Physics and Thermal Hydraulics (Enfir), the X Meeting on Nuclear Applications (Enan) and the II Meeting on Nuclear Industry (Enin).

Topics to be discussed at the event include nuclear power plant and research reactor operation, maintenance, troubleshooting, security and safety; research; irradiation activities; education; communications and public information; training programs; reactor siting, decontamination and decommissioning activities; current regulatory issues; radiopharmaceuticals; nuclear instrumentation; reactor physics; radioprotection; radioactive waste management; sustainability of energy sources; the uranium market; and social responsibility.

INAC 2011 will also promote the fourth edition of the Junior Poster Technical Sessions, where, under the supervision of nuclear researchers from Brazilian institutions, undergraduate students from a number of colleges and universities present relevant results achieved in their research work.

Completing the one-week program, ExpoInac, the event's traditional technical and commercial exhibition, showcases the contribution made by nuclear technology, products and services to the quality of life in our society.

The conference will also include a historical exhibition, open to the general public, to celebrate the 50th anniversary of the Triga IPR-R1, the first reactor of its type installed in the southern hemisphere, and the 59th anniversary of the Nuclear Technology Development Center (CDTN), the first nuclear energy research institute founded in Brazil, both located in Belo Horizonte.

Details about registration and paper submission can be found at the conference website: <http://www.inac2011.com.br/inac.php>.

CALENDAR

June 2011

ANS Annual Meeting, June 26–30, 2011, Hollywood, FL. The website is <http://www.new.ans.org/meetings>.
IRRMA-8, Industrial Radiation and Radioisotope Measurement Applications, June 26–July 1, 2011, Kansas City, MO. Contact: William L. Dunn, Kansas State University (email dunn@k-state.edu) url <http://www.dce.k-state.edu/conf/irрма/>.

July 2011

Training course on PENELOPE 2010 - A Code System for Monte Carlo Simulation of Electron and Photon Transport, July 4–7, 2011, University of Barcelona, Barcelona, Spain. Contact: <http://www.oecd-nea.org/dbprog/courses/penelope2011-reg.php>.

September 2011

SET 2011, 10th International Conference on Sustainable Energy Technologies, Sept. 4–7, 2011, Istanbul, Turkey. Contact: Prof. Dr. Sümer Sahin, Atılım University (email ssahin@atilim.edu.tr) url <http://www.set2011.org>.

ICTT-22, International Conference on Transport Theory, Sept. 11–15, 2011, Portland, Oregon. Contact: Todd Palmer, Technical Program Chair, Oregon State University (palmerts@ne.orst.edu) url <http://ne.oregonstate.edu/ICTT/>.

ICNC2011, International Conference on Nuclear Criticality, Sept. 19–22, 2011, Heriot-Watt University, Edinburgh, United Kingdom. Contact: Energy Customer Services, Informa UK Ltd, PO Box 406 West Byfleet KT14 6NN UK (phone +44 0 20 7017 5518, fax +44 0 20 7017 4745, email energycustserv@informa.com) url <http://www.informaglobalevents.com/event/icnc2011>.

October 2011

2011 ANS Winter Meeting and Nuclear Technology Expo, Oct. 30–Nov. 3, 2011, Washington, DC. The website is http://www.new.ans.org/meetings/c_1.