Radiation Safety Information Computational Center

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Timothy E. Valentine, Ph.D. - RSICC Director

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"When a father gives to his son, both laugh; when a son gives to his father, both cry." –William Shakespeare

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CHANGES TO THE RSICC CODE AND DATA COLLECTION

There are two updates to the RSICC catalog for those individuals that may be interested.

CCC-836/FISPACT-II

United Kingdom Atomic Energy Authority, Culham Science Centre, Abingdon, Oxfordshire, United Kingdom through the OECD NEA Data Bank, Issy-les-Moulineaux, France, contributed Fispact-II. Fispact-II is an inventory code capable of performing modeling of activation, transmutations and depletion induced by neutron, proton, alpha, deuteron or gamma particles incident on matter.

Fispact-II is written in object-style Fortran and has full dynamic memory allocation. It has improved algorithms for the ODE solver, pathways, uncertainty and sensitivity calculations. All these can be used in multi-pulse irradiation calculations, including those where the ux spectrum changes from pulse to pulse. It reads the modern, ENDF-style data libraries, as well as certain legacy libraries such as EAF, and the present version uses the latest TALYS-based TENDL evaluated nuclear data libraries together with probability table data from CALENDF for including self-shielding in the calculations. These libraries allow additional projectiles and nuclides to be included, and make possible additional kerma, emitted spectra, dpa and appm diagnostics. Fispact-II utilizes numerical LSODES, Livermore Solver for Ordinary Differential Equations with general sparse Jacobian matrices. Backward Differentiation Formula (BDF) methods (Gear's method) in stiff cases to advance the inventory, Adams methods (predictor-corrector) in non stiff case, Yale sparse matrix efficiently exploits the sparsity.

The 64-bit Linux and 32/64-bit Windows PC executables: CentOs-6.7, OL-7.1, OpenSUSE-12.3, OpenSUSE-13.2, OsX-10.10.5, SL-6.7, Ubuntu-14.04 and Windows7 from ifort, gfortran, g95, oracle and pgfortran compilers. The package is transmitted on 1 Dual-Layer (DL) DVD which includes documentation, executable files, source code, Makefiles, Installer, data files and test cases. Fortran 2003; IBM, Unix and Linux Workstations, Solaris, Mac (C00836MNYCP00).

REGISTRATION REQUIREMENTS

RSICC does not permit individuals to "pre-register" or "pre-order" software for use at a temporary or alternate location. The single user license and export control agreements are specific to the individual's end use and the location at which the software will be used. During the registration process, individuals are required to provide the name of the institution at which they will use the software, an institutional mailing address and an institutional e-mail address. As an example, students that work at a location other than their university are required to update their registration with RSICC and submit a new request for any software that they intend to use after they have begun work at the new location.

SINGLE-USER LICENSE AGREEMENT REVISED

The single-user license agreement has been revised to address concerns regarding changes in end-use and employment changes of individuals that have received packages from RSICC. In some instances individuals obtain approvals from our Federal regulators for use of software packages for very specific purposes or while employed or associated with specific organizations. To address this concern, the single-user license agreement has been modified to indicate that the license is only valid for the end-use as stated in the Licensee's request and only while associated with the organization under which the request is being made. After February 1, 2015, the individual's single-user license would no longer be valid if they change their end-use or are no longer associated with the organization for which they obtained the original license. In these cases, the individual would need to submit a new request to RSICC for the package for the new end-use or the new affiliation.

SCIENCE EDUCATION PROGRAMS AT OAK RIDGE NATIONAL LABORATORY

Looking for an internship or post-graduate opportunity at Oak Ridge National Laboratory? The Science Education Programs at Oak Ridge National Laboratory provide paid opportunities for undergraduates, grad students, recent graduates, and faculty to participate in high-quality research alongside world-class scientists to solve real-world problems. Opportunities are available for internships and co-ops, research appointments, and sabbaticals.

You can access all available opportunities through the website at http://www.orau.org/ornl. The Talent and Opportunity System allows you to create a profile, and then answer only 5 or 6 questions for each program or job posting for which you apply.

All levels of participants from undergraduates to faculty are encouraged to publish research papers with their mentors. Please browse through the Research Profiles on the different participants and their research experiences at the right hand side of the bottom of the web site listed above. Also, there is a video of research participants at ORNL sharing their thoughts on how access to world-class research facilities and staff has catapulted their careers in science and technology. You can find it on YouTube at http://ow.ly/2EQLz.

CONFERENCES, TRAINING COURSES, SYMPOSIA

RSICC attempts to keep its customers 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 walkersy@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. Please provide a website address for the event if one is available.

Every attempt is made to ensure that the links provided in the Conference and Calendar sections of this newsletter are correct; however, if the links become unavailable, please call the point of contact for the event.

CONFERENCES

ANS Fusion Energy Division

The ANS 2016 TOFE conference will be held in Philadelphia PA, and hosted by the Princeton Plasma Physics laboratory from **August 22-25, 2016**. The theme is "Advancing the Globalization of Fusion Energy Technology."

More information about the conference can be found at: http://tofe2016.ans.org/.

NENE 2016
September 5 - 8
PORTOROŽ
SLOVENIA
25th International Conference Nuclear Energy for New Europe

NENE 2016

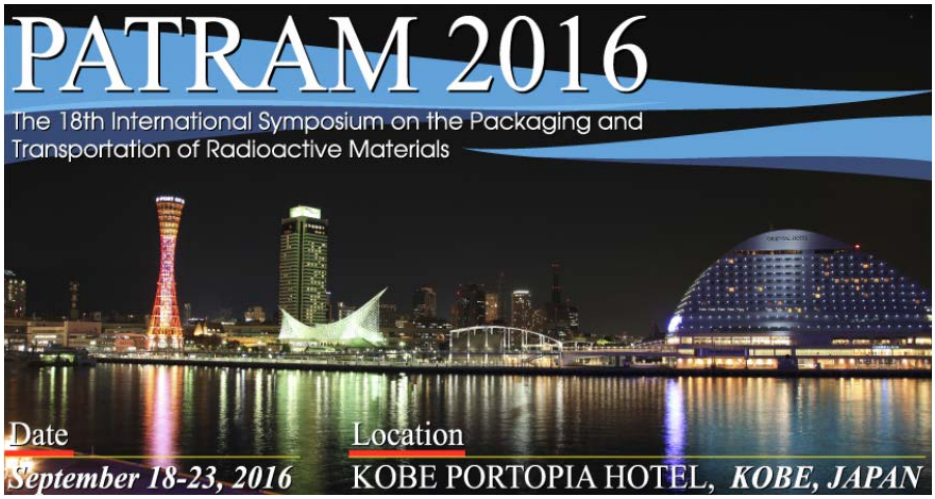
Nuclear Society of Slovenia invites you to attend the traditional already 25th meeting of professionals from nuclear research organizations, educational institutions, nuclear utilities, industrial companies and regulatory bodies, held in the sea resort of Portorož, **September 5-8, 2016**. Special attention will be paid to 50 years of the Slovenian TRIGA reactor and role of research reactors to support nuclear energy. More information is available at www.nss.si/nene2016/ and nene2016@ijs.si.

ND2016

The next International Conference on Nuclear Data for Science and Technology will be held in Bruges, Belgium, **September 11-16, 2016**. ND2016 is the primary conference for the advancement of nuclear data in the interest of both science and technology. It addresses all important active fields of investigation: fundamental nuclear physics, astrophysics, nuclear energy, nuclear medicine, nuclear non-proliferation, safeguards and arms control. Please see their website for more details: http://www.nd2016.eu/.

5th International Conference on Nuclear and Renewable Energy Resources (NURER2016)

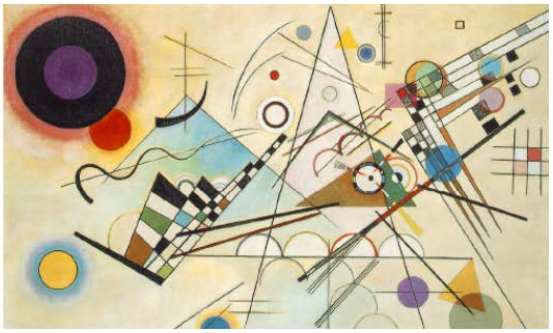
The 5th International Conference on Nuclear and Renewable Energy Resources (NURER2016) hosted by Institute of Nuclear Energy Safety Technology, Chinese Academy of Sciences, in Hefei, Anhui, China, from **September 18-21, 2016**. Please see the website for more information. http://nurer2016.org.cn/dct/page/1.



PATRAM 2016

The 18th International Symposium on Packaging and Transportation of Radioactive Materials (PATRAM) will be held **September 18-23, 2016**, in Kobe, Japan. PATRAM brings together experts from governments, industries and research organizations worldwide to exchange information on all aspects of packaging and transport of radioactive materials around the globe. Please see their website for more details: http://www.patram2016.org/.

ICRS 13
RPSD 2016
October 3|6, 2016
Paris, France



ICRS 13 RPSD 2016

Paris is honored to host the joint conference 13th International Conference on Radiation Shielding (ICRS-13) & 19th Topical Meeting of the Radiation Protection & Shielding Division of the American Nuclear Society -2016 (RPSD-2016), from **October 3-6, 2016.** This conference explores the scientific, technological and engineering issues associated with particle and ionizing radiation shielding in its broadest context, including nuclear energy systems, accelerator facilities, lasers, space, medical area and other radiation environments. It is one of the premier international events dedicated to this multidisciplinary radiation shielding field, regularly attracting hundreds of the world's top scientists and engineers. For more information, please visit their website: https://fr.amiando.com/icrs13-rpsd2016.html.

Nuclear Knowledge Management

The Third International Conference on Nuclear Knowledge Management, Challenges and Approaches will be held **November 7-11, 2016** in Vienna, Austria. Detailed information can be found on their website http://www-pub.iaea.org/iaeameetings/50805/Third-International-Conference-on-Nuclear-Knowledge-Management-Challenges-and-Approaches. Please include reference number IAEA-CN-241 in all communications.

TRAINING COURSES

Safety Analysis Report for Packaging (SARP)
Analyst Course
Developed and Conducted by Oak Ridge National Laboratory

Radioactive Material Package Shielding Evaluation and Nuclear Criticality Safety Evaluation Training

The U.S. Department of Energy (DOE) Packaging Certification Program (PCP), Office of Packaging and Transportation, is offering Safety Analysis Report for Packaging (SARP) shielding and nuclear criticality safety (NCS) course for SARP analysts.

The Analysts Course will provide detailed training on the radioactive material package shielding analyses and NCS evaluation fundamentals needed by analysts/practitioners (i.e., safety analysts and/or technical reviewers) to prepare and/or review technical analyses for the SARP documentation. The Analyst Course also provides an overview of regulations and guidelines in addition to detailed in-class exercises associated with the package shielding and NCS analyses. With regard to the in-class exercises, analysis teams will be faced with "staged" SARP examples in which a number of important decision processes in the generation of a SARP will be demonstrated and discussed. The SARP Analyst Course is scheduled for **September 12-16, 2016** at Oak Ridge National Laboratory, Oak Ridge, TN. The registration cost for all students is $2000. Information regarding the course is available at the following website: https://public.ornl.gov/conferences/sarp2016/index.shtml, and registration link.

Please contact the ORNL SARP Course Point-of-Contact if you have questions about the course. Douglas G. Bowen, Oak Ridge National Laboratory, bowendg@ornl.gov,(865) 576-0315.

SATIF-13

13th Meeting of the task-force on Shielding Aspects of Accelerators, Targets, and Irradiation Facilities

The 13th meeting of the task force on Shielding Aspects of Accelerators, Targets and Irradiation Facilities (SATIF-13) will take place at the Helmholtz-Zentrum Dresden-Rossendorf (HZDR) in Dresden, Germany, **October 10-12, 2016**.

Keeping the original spirit of the SATIF Meetings, which have as main objectives the promotion of the information exchange and the international co-operation among experts in the field of accelerator, target and irradiation facilities shielding, we look forward to work with you to make this event an opportunity to progress in our common research field. The web site of SATIF-13 is https://www.hzdr.de/SATIF13.

LANL MCNP6 Class Schedule for 2016

Website: https://laws.lanl.gov/vhosts/mcnp.lanl.gov/classes/classinformation.shtml

July 27-29, 2016 Los Alamos, NM	Unstructured Mesh with Attila4MC Non-US citizens must register by 2016-05-04 | Wed 12:30 - Fri 4:30	$1000 or $800*
Aug 1-5, 2016 Los Alamos, NM	Introduction to MCNP6 Non-US citizens must register by 2016-05-09 | Mon 10:30 - Fri 12:00	$1800 or $1500*

Aug 8-12, 2016 Los Alamos, NM	Variance Reduction with MCNP6 Non-US citizens must register by 2016-05-16 | Mon 10:30 - Fri 12:00	$1800 or $1500*
Aug 15-19, 2016 Los Alamos, NM	Criticality Calculations with MCNP6 Non-US citizens must register by 2016-05-20 | Mon 10:30 - Fri 12:00	$1800 or $1500*
Oct 25-26, 2016 Los Alamos, NM	Using NJOY to Create MCNP ACE Files & Visualize Nuclear Data Non-US citizens must register by 2016-08-01 | Thursday 10:00 - Fri 5:00	$800 or $600*
Oct 31 - Nov 4, 2016 Los Alamos, NM	Introduction to MCNP6 Non-US citizens must register by 2016-08-08 | Mon 10:30 - Fri 12:00	$1800 or $1500*

*** Early payment discount:** A discount of $300 per student is given when the registration payment is received in full at least 4 weeks before the start of class.

*** Classes may be cancelled or postponed if fewer than 8 students register.**
*** Maximum of 15 students per class.**
*** If a class is marked as FULL, CANCELLED, or COMPLETED, then you cannot register for it.**

Introductory classes are for those who have little or no experience with MCNP®. This class surveys the features of MCNP® so the beginning user will be introduced to the capabilities of the program, and will have hands-on experience at running the code to solve simple problems. Course topics include Basic Geometry, Source Definitions, Output (Tallies), Advanced Geometry (repeated structures specification), Variance Reduction Techniques, Statistical Analysis, Criticality, Plotting of Geometry and Tallies, and Neutron / Photon / Electron Physics.

Intermediate workshops cover the entire spectrum of MCNP®/MCNPX but proceed at a much faster pace and are more in-depth than introductory classes. These workshops are open to new users; the first day of class is a review of basics. However, the intermediate workshops are targeted toward more experienced users and are more problem solving than lecture classes. Intermediate workshops feature flexible course content, skip topics of least interest to the participants, and provide significantly more depth than introductory classes.

Advanced classes - Variance Reduction & Criticality are for people with MCNP® experience who want to extend their knowledge and gain depth of understanding. Most areas of MCNP® operation will be discussed in detail, with emphasis on Advanced Geometry, Advanced Variance Reduction Techniques, and other advanced features of the program. Time will be available to discuss approaches to specific problems of interest to participants. Classes on specific topics are offered when there is sufficient interest.

NOTE: While MCNP® supports a number of platforms, LANL class computers are usually Windows based.

More information about the MCNP® courses at LANL is available on their website at https://laws.lanl.gov/vhosts/mcnp.lanl.gov/classes/classinformation.shtml.

MCNP6 and Visual Editor Training

Website: http://www.mcnpvised.com/index.html

MCNP6 Intermediate Workshops 2016		
July 4-8, 2016	MCNP6 Intermediate Workshop	Prague, Czech Republic
August 22-26, 2016	MCNP6 Intermediate Workshop	Livermore, CA
October 17-21, 2016	MCNP6 Intermediate Workshop	Paris, France

Intermediate Workshops cover the entire spectrum of MCNP6® but proceed at a much faster pace and are more in-depth than Introductory Classes. These workshops are open to new users; the first day is a review of basics. However, the intermediate workshops are targeted toward more experienced users and are more problem solving than lecture classes. Intermediate workshops feature flexible course content, skip topics of least interest to the participants, and provide significantly more depth than introductory classes.

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://www.mcnpvised.com/train.html.

To register send an email to Randy Schwarz at randyschwarz@mcnpvised.com, indicating the workshop of interest to you.

Visual Editor Classes 2016		
June 27-July 1, 2016	Beginning Visual MCNP6	Prague, Czech Republic
July 11-15, 2016	Advanced Visual MCNP6 with Applications in Mesh Tallies and Variance Reduction.	Prague, Czech Republic
September 12-16, 2016	Beginning Visual MCNP®	Las Vegas, NV
September 19-23, 2016	Advanced Visual MCNP6 with Applications in Mesh Tallies and Variance Reduction.	Las Vegas, NV
October 10-14, 2016	Beginning Visual MCNP6	Paris, France
November 7-11, 2016	Penelope	Las Vegas, NV

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.

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.

NEA Nuclear Energy Agency

This workshop combines teaching by the authors on program physics, along with instructions on how to use the software. The course include a large number of practical exercises.

Should you be interested in attending, information is available at:

http://www.oecd-nea.org/dbprog/trainingcourses.htm or contact: programs@oecd-nea.org.

Courses scheduled for 2016 will take place at the new address (provided in registration forms). Please note that all attendees must be registered users.

Date	Class	Course Content	Price	Location
June 27-July 1, 2016	Electron-Photon Transport Modelling with PENELOPE-2014, Physics, Code Structure and Operation.	Course description register	1000 EUR	Barcelona, Spain

Contact: programs@oecd-nea.org

SCALE Training Courses – Summer 2016

Training is provided by developers and expert users from the SCALE team. Courses provide a review of theory, description of capabilities and limitations of the software, and hands-on experience running problems of varying levels of complexity.

All attendees MUST be licensed SCALE 6.2 users. SCALE 6.2 is available from ORNL/RSICC in the USA, the OECD/NEA Data Bank in France, and the RIST/NUCIS in Japan. All currently scheduled SCALE Courses are described below.

Date	Course Name and Description	Location	Cost
August 8-10, 2016	*Introduction to New Features in SCALE 6.2: This course highlights advancements in SCALE capabilities introduced in SCALE 6.2. The 5-day course is divided into two 2.5-day mini-courses that can be taken independently or as a set.* **Mini-course 1: SCALE 6.2 Lattice Physics and Stand-alone Fuel Depletion, Activation, and Source Term Analysis** Topics include the Fulcrum graphical user interface, keyword based user input for ORIGEN that eliminates dependence on the 50-year old FIDO input format, the ORIGAMI tool for simplified characterization of spent fuel, and the Polaris code for advanced and convenient LWR lattice physics analysis. Registration is available for the full week or either 2.5-day mini course. An overview of SCALE 6.2 and introduction to Fulcrum are included in both mini courses.	ORNL Oak Ridge, TN, USA	$1000*
August 10-12, 2016	*Introduction to New Features in SCALE 6.2: This course highlights advancements in SCALE capabilities introduced in SCALE 6.2. The 5-day course is divided into two 2.5-day mini-courses that can be taken independently or as a set.* **Mini-course 2: SCALE 6.2 Monte Carlo Calculations and Uncertainty Analysis** Topics include the Fulcrum graphical user interface and the Sampler tool for stochastic uncertainty quantification through perturbation of nuclear data, composition, and/or dimension input to any SCALE sequence. Advancements to the suite of Monte Carlo transport tools will be discussed, including new continuous energy capabilities in Monaco and TSUNAMI-3D, improvements and parallelization of KENO, and new continuous-energy depletion capabilities in TRITON. Registration is available for the full week or either 2.5-day mini course. An overview of SCALE 6.2 and introduction to Fulcrum are included in both mini courses.	ORNL Oak Ridge, TN, USA	$1000*

August 15-19, 2016	**SCALE Criticality Safety Calculations Course** This course provides instruction on the use of the KENO Monte Carlo codes for criticality safety calculations and is appropriate for beginning through advanced users. KENO V.a is a fast and easy-to-use code that allows users to build complex geometry models using basic geometrical bodies such as cuboids, spheres, cylinders, hemispheres, and hemicylinders. KENO-VI is a 3-D generalized geometry Monte Carlo code that allows for versatile modeling of complex geometries. Both versions of KENO provide convenient, efficient methods for modeling repeated and nested geometry configurations such as lattices. Both versions of KENO use the ENDF/B-VII cross-section data distributed with SCALE to perform either continuous energy (CE) or multigroup (MG) calculations.	ORNL Oak Ridge, TN, USA	$2000*
August 22-26, 2016	**SCALE Sensitivity and Uncertainty Analysis for Criticality Safety Validation Course** Sensitivity and uncertainty analysis methods provide advanced techniques for code and data validation including the identification of appropriate experiments, detailed quantification of bias and bias uncertainty, identification of gaps in available experiments, and the design of new experiments. The TSUNAMI sensitivity and uncertainty analysis techniques in SCALE 6.2 provide the ability to quantify the sensitivity of system responses including keff and reactivity in multi-group and continuous energy modes. SCALE's comprehensive cross-section-covariance data library is applied to these sensitivity coefficients to determine the uncertainty in the system responses due to each nuclide and reaction. The correlation of nuclear data uncertainties between experiments and design systems provides an advanced means of determining bias and bias uncertainty for design and licensing. This 4 1/2-day training class provides a foundation for sensitivity and uncertainty analysis, instructions on the TSUNAMI-1D and -3D sequences for eigenvalue sensitivity analysis, the TSURFER data adjustment tool, and the TSAR tool for reactivity sensitivity analysis. Instruction is also provided in advanced validation techniques that apply sensitivity and uncertainty data in trending analysis as well as generalized linear least squares techniques. Attendees should be familiar with the KENO Monte Carlo code or be experienced SCALE users, although these are not necessary prerequisites.	ORNL Oak Ridge, TN, USA	$2000*
August 29 – September 2, 2016	**SCALE/ORIGEN Standalone Fuel Depletion, Activation, and Source Term Analysis Course** Isotopic depletion, activation analysis, and source term characterization using ORIGEN and the new ORIGAMI tool for convenient characterization of used nuclear fuel with radially and axially varying burnup.factors for non-uniform lattices; generation of ORIGEN reactor libraries for spent fuel characterization	ORNL Oak Ridge, TN, USA	$2000*

***Full-time university students can register at a reduced rate. Both professional and student registration fees are discounted $200 for each course over one. Discount only applies to FULL weeks of training.*

FOREIGN NATIONAL VISITORS TO ORNL - Important! - All Foreign Nationals must present passport and visa to ORNL guards upon arrival at the entry portals and ORNL Visitor

Center. Access to ORNL will be denied if you do not have these documents. If you are coming from a country that meets the criteria of the Visa Waiver Program, please have the correct status of Visa-Waiver BUSINESS (either VWB or B-1). You must clearly state to the immigration officer that this is a business visit. You cannot enter ORNL with a Visa-Waiver TOURIST.

For more information regarding these classes, visit their website at http://scale.ornl.gov/training_2016_aug-sept.shtml.

SYMPOSIA

2016 CALENDAR

June

2016 Society of Nuclear Medicine and Molecular Imaging (SNMMI) Annual Meeting, June 11-15, 2016, San Diego, CA. More information to follow.

2016 American Nuclear Society (ANS) Annual Meeting. June 12-16, 2016. New Orleans, LA.

July

61st Annual Health Physics Society (HPS) Meeting, July 17-21, 2016, Spokane, WA. See website for more information http://hps.org/meetings/meeting39.html.

November

2016 American Nuclear Society (ANS) Winter Meeting and Nuclear Technology Expo. November 6-10, 2016, Las Vegas, NV.

2017 CALENDAR

May

2017 International Symposium on Reactor Dosimetry, ISRD-16. May 7-12, 2017, Santa Fe, New Mexico. See website for more information http://reactordosimetry.org.

June

2017 American Nuclear Society (ANS) Annual Meeting. June 11-15, 2017, San Francisco, CA.

July

62nd Annual Health Physics Society (HPS) Meeting. July 9-13, 2017, Raleigh, NC.

October

2017 American Nuclear Society (ANS) Winter Meeting and Nuclear Technology Expo. October 29-November 2, 2017, Washington, DC.