RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

OPERATED BY UNION CARBIDE CORPORATION • FOR THE U.S. ATOMIC ENERGY COMMISSION

POST OFFICE BOX X •
OAK RIDGE, TENNESSEE 37831

No. 91 June 1972

Don't keep forever on the public road,
going only where others have gone.
Leave the beaten track occasionally
and dive into the woods.
You'll be certain to find something
you have never seen before.

... Alexander Graham Bell

CODE DISCUSSION CORNER

With this issue of the Newsletter, we are launching what may be a regular or an occasional feature - the CODE DISCUSSION CORNER. We do not seek a fixed format. What we are after is lively reader discussion of specific codes. Is there something in a code you do not understand, something that bothers you, something you have added or think should be added, something you think is wrong, or something you consider particularly attractive?

To launch the Corner (and, simultaneously, mix a metaphor), we would like to call your attention to the program ASFIT (CCC-153). It comes to us from Bhabha Atomic Research Center, Bombay, India. ASFIT is a one-dimensional multi-region, multivelocity, neutron and gamma-ray transport code. The one dimension further appears to be limited to a Cartesian coordinate. Apart from this rather severe geometric limitation, the program appears to be very flexible and general, permitting also any degree of anisotropy.*

The Boltzmann equation is recast in the form of a pair of coupled integral equations, one featuring the spatial transmission kernel, the other the scattering kernel. In the solution of this set of equations, the flux and source functions are fit piecewise by approximating polynomials. Care is taken to treat properly the discontinuity in the first collision fluxes when present.

Considerable care has been taken to study effects of varying mesh size and other computational artifacts. This appears to be an efficient and well constructed code.

**D. V. Gopinath, K. Santhanan, "Radiation Transport in One Dimensional Finite Systems."*

ANS REACTOR PHYSICS DIVISION SPECIAL

The ANS Reactor Physics Division announces two special sessions for the Las Vegas meeting of the Society: "Radiation and Man" on Monday afternoon, and "Neutron Cross Section Measurements" on Wednesday afternoon. These are in addition to 11 other sessions which contain contributed papers on reactor physics subjects.

The program committee has selected the papers for the September 12-15, 1972 Topical Meeting on "New Developments in Reactor Physics and Shielding" to be held at The Concord, Kiamesha Lake, New York. Information on the Conference may be secured from Norman Francis, KAPL, Box 1072, Schenectady, New York 12301. The program, cosponsored by the Shielding and Dosimetry Division and the Northeastern New York Section, includes the following.

TUESDAY, SEPTEMBER 12, 1972

NEUTRON AND REACTOR PHYSICS IN THE THERMAL ENERGY RANGE
Chairman/Donald H. Roy (B&W)
Co-Chairman/Richard Ehrlich (KAPL)

1. Physics of PWR Reactors - R. L. Hellens (CE), Invited
2. Physics Measurements of BWR Reactors and Comparison with Theory R. L. Crowther (GE-NEPD), Invited
3. The Physics of High Temperature Gas Cooled Reactors (HTGRS) - R. C. Dahlberg (GGA), Invited
4. Reactor Physics of High Temperature Reactors - B. Laponche, F. Morier, et al. (CEA France)
5. Some Problems in the Physics of High Temperature Reactors - J. G. Tyror, J. R. Askew, I. Johnstone (UKAEA-AEE)
6. Methods for 3-Dimensional Fuel Management Studies on High Temperature Reactors - D. W. Anderson, J. R. Askew, K. G. Pearson (UKAEA-AEE)
7. Energy Dependent Cross Sections in the Thermal Range - B. R. Leonard, Jr. (PNL), Invited
8. Predicting Production Rates of Heavy Actinides - W. E. Graves, R. W. Benjamin (SRL)
9. The Effect of Particle Size in Pu-240 Resonance Capture - R. Goldstein (CE)

REACTOR THEORY
Chairman/Martin Becker (RPI)

1. Fast Neutron Slowing Down Theory and Group Constant Generation - W. M. Stacey, Jr. (ANL), Invited
2. Advances in the Variational Method and Perturbation Theory - J. Lewins, (U of London), Invited
3. Advances and Current Problems in Reactor Kinetics - K. Ott (Purdue), Invited

4. Green's Function Coupling Method for Time-Dependent Neutron Slowing Down in Heavy Media - R. Conn, M. Sawan (U of Wis)
5. A Many-Resonance Approximation for the Neutron Energy Spectrum - M. Segev (Soreq NRC, Israel)
6. Predetermining Statistical Errors in Monte Carlo Transport Calculations - H. J. Amster (UC-Berkeley)
7. Advances in Methods for Fast Neutron Multigroup Cross Section Calculations and Their Effect Upon the Neutronics Properties of LMFBR Critical Assemblies - W. M. Stacey, Jr., R. Henryson, II, B. A. Zolotar, R. N. Hwang, B. J. Toppel, C. G. Stenberg (ANL)

WEDNESDAY, SEPTEMBER 13, 1972

REACTOR SHIELDING I
Chairman/J. Robert Beyster (SA)

1. Measurement and Evaluation of Cross Sections - V. J. Orphan (GGA), Invited
2. Development of ENDF/B Shielding Data, Processing Codes, and Integral Tests - R. J. LaBauve, R. E. Seamon, C. R. Weisbin, D. R. Harris, D. W. Muir (UC-LASL)
3. Secondary Gamma-Ray-Production Cross Sections for Several Materials - G. L. Morgan, T. A. Love, J. K. Dickens, F. G. Perey (ORNL)
4. The Mechanisms of Fast Neutron Transport in Iron - H. Goldstein (Columbia U)
5. Integral Experiments and Philosophy of Benchmark Calculations - E. A. Straker (SA), Invited
6. Developments in Integral Shielding Experiments Involving Fast-Neutron Transport - L. Harris, Jr. (Gulf Rad Tech)
7. The Carbon Shielding Benchmark Problem and Other Neutron Transport Calculations in Carbon - H. Goldstein (Columbia U)
8. Sensitivity of Calculated Pulsed Sphere Spectra and Neutron Age to Carbon Cross Sections - C. R. Weisbin, R. E. Seamon, D. R. Harris, L. Stewart, R. J. LaBauve, G. D. Turner (UC-LASL)
9. The ORNL Sodium Benchmark Experiment - R. E. Maerker, F. J. Muckenthaler (ORNL)
10. FFTF Coolant Duct Streaming Experiment - B. J. McGregor, F. J. Muckenthaler (ORNL)

REACTOR SHIELDING II
Chairman/Edward A. Straker (SA)

1. Current Status of Calculational Methods and Nuclear Data in Shielding - J. L. Rathbun (WARD), Invited
2. Diffusion Theory Analyses for Fast Reactor Shield Design - E. T. Boulette, D. R. Marr (WADCO)

3. CNSG-Nuclear Ship Oxygen Activation Calculational Method with Benchmark - F. N. Anderson (B&W)
4. Fast Reactor Shielding Methods Development - F. Mynatt (ORNL), Invited
5. An Effective Multiple-Constraint Optimization Technique - M. P. Billings (McDonnell Douglas)
6. DOMINO - A General Purpose Discrete Ordinates to Monte Carlo Coupling Code for Radiation Transport - C. E. Burgart (SA), M. B. Emmett, T. J. Hoffman (ORNL)
7. Neutron and Gamma Physics Problems in Fusion Reactors - C. W. Maynard (U of Wis)

FAST CRITICAL EXPERIMENTS AND DELAYED NEUTRON EFFECTS
Chairman/Walter Y. Kato (ANL)

1. Boron and Tantalum Control Rod Studies and Absolute Gamma Ray Absorbed Doses in LMFBR Criticals - G. G. Simons, A. P. Olson (ANL-Idaho)
2. Use of Integral Data from Fast Assemblies for Adjustments of Neutron Data - H. Häggblom (AB Atomenergi, Sweden)
3. The Use of CFRMF Integral Cross Section Data in Cross Section Evaluations - E. H. Turk, Y. D. Harker (Aerojet)
4. Evaluation and Interpretation of Integral Experiments in Fast Criticals - E. Kiefhaber (Karlsruhe, Germany)
5. Monte Carlo Calculations for the Critical Experiment at the German Incore Thermionic Reactor - F. A. R. Schmidt, W. Bernat, S. Dagbjartsson (Institut für Kernenergetic, Germany)
6. Experimental Results from Two Pu-Fueled Fast Critical Assemblies - R. Böhme, E. A. Fischer, P. E. McGrath, W. Scholtyssek (Karlsruhe, Germany)
7. Impact of the New LASL Delayed Neutron Data on FTR Design - S. Ramchandran, K. R. Birney (WARD)
8. Measurements of Delayed Fission Neutron Spectra of U-235, U-238, and Pu-239 with Proton-Recoil Proportional Counters - G. Fieg (Karlsruhe, Germany)
9. Measurements of β_{eff} in Pu-Fueled Fast Critical Assemblies - R. Böhme, E. A. Fischer, P. E. McGrath (Karlsruhe, Germany)
10. Verification of a New Method for Calculating and Measuring Generation Time in a Subcritical Fast Reactor - A. R. Buhl (ORNL)
11. GE Nuclear Design and Benchmark Critical Experiment Plan for the LMFBR Demonstration Plant - H. S. Bailey, S. L. Stewart (GE-NEPD)

THURSDAY, SEPTEMBER 14, 1972

FAST REACTOR PHYSICS I
Chairman/Max Yeater (RPI)
Co-Chairman/Bimal K. Malaviya (RPI)

1. Review of FBR Physics - R. Avery (ANL), Invited
2. Demonstration Reactor Benchmark Program - W. G. Davey (ANL-Idaho), Invited
3. Spatially Dependent Benchmark Parameters in the Initial Demonstration Plant Critical Assembly - P. I. Amundson, W. G. Davey, R. G. Palmer, S. G. Carpenter, C. L. Beck, R. W. Goin, R. J. Forrester, R. O. Vosburgh, D. W. Maddison, J. M. Gasidlo, R. E. Kaiser, W. P. Keeney (ANL-Idaho)
4. Reactor Physics and Fast Power Breeders: MASURCA Core R-Z Program - J. Y. Barré, J. Boyer, J. C. Mougniot, B. Sicard (CEA, France)
5. FTR Neutronics: Status Problems and Development Programs - P. L. Hofmann (WADCO), Invited
6. Experimental Analysis of the Evolution of Irradiated Fast Breeder Reactor Fuel - J. Bouchard, D. Chavardes, M. Darrouzet, M. Robin (CEA, France)
7. EBR-II Program - W. B. Loewenstein (ANL-Idaho), Invited
8. Significance of Integral Parameters in the Design and Performance of FBR's - P. Greebler, B. A. Hutchins (GE-NEPD), Invited

FAST REACTOR PHYSICS II
Chairman/Frank Feiner (KAPL)

1. Fast Neutron Spectra - C. A. Preskitt, Jr. (GGA), Invited
2. Proton-Recoil Proportional Counter Spectrometry for Reactor Spectrum Measurements - V. V. Verbinski, R. Giovannini, D. H. Houston, J. C. Young, J. M. Neill (Gulf Rad Tech)
3. Summary of Analyses of Plate Versus Pin Measurements Emphasizing Sodium Void Effects - T. A. Pitterle, N. C. Paik (WARD), Invited
4. Sodium Void Studies and Related Hetergeneity Effects in ZPPR-2, the Benchmark Demonstration Assembly - R. G. Palmer, W. G. Davey, P. I. Amundson, R. E. Kaiser, C. L. Beck, P. J. Collins (ANL-Idaho)
5. SEFOR: Verification of the Doppler Transient Shutdown Capability of LMFBR's - L. D. Noble, G. Pflasterer, Jr. (GE-NEPD), Invited
6. On the Effect of Core Configuration on ^{238}U Doppler-Measurements in ZPPR Assembly 2 - R. E. Kaiser, J. M. Gasidlo (ANL-Idaho)
7. Pulsed-Activation Techniques for the Measurement of Doppler Effects - W. K. Foell, G. J. Russell, D. M. Lucoff, S. K. Bhattacharyya (U of Wis)

8. Benchmark Testing of Nuclear Data for Fast Reactors - H. Alter (AI), Invited
9. TEDIUM: Idealized Neutron Data for Testing Library Processing Codes - M. Raymund (W-NES)

FRIDAY, SPETEMBER 15, 1972

NEUTRON PHYSICS IN THE RESOLVED AND UNRESOLVED RESONANCE RANGE
Chairman/Felix Adler (U of Illinois)

1. The Current Status of Nuclear Data - A. B. Smith (ANL), Invited
2. keV Neutron Total Cross Section Measurements at ORELA - J. A. Harvey, (ORNL)
3. Fission Cross Sections and the Fission Process - A. Michaudon (CEA, France)
4. Iron-Filtered Neutron Beams - A New Approach to Precision Time-of-Flight Cross Section Measurements - R. E. Block, N. N. Kaushal, R. W. Hockenbury (RPI)
5. Temperature-Dependent Transmission and Self-Indication Measurements Upon Depleted U in the Unresolved Region - T. Y. Byoun, R. C. Block (RPI), T. Semler (NASA-Lewis)
6. The Basis of Current Evaluated Data Files - M. K. Drake (BNL), Invited
7. The Fast Neutron Doppler Effect - C. E. Till (ANL), Invited
8. Some Recent Developments in Resonance and Doppler Theory - R. N. Hwang (ANL)

FEATURED EVENTS

Wednesday, September 13, 1972 - 6:30 PM
Speaker: Dr. Alvin M. Weinberg, Director, Oak Ridge National Laboratory
"History of Reactor Technology"

Thursday, September 14, 1972 - 1:00 PM
Dr. William H. Hannum, Manager, Reactor Physics Branch,
Division of Reactor Development and Technology, USAEC,
"Projections for the Future of Reactor Physics"

ANS SHIELDING AND DOSIMETRY DIVISION LEADERSHIP FOR 1972-1973

The recent election results for the ANS Shielding and Dosimetry Division are announced as follows:

Chairman:	Donald J. Dudziak, LASL
Vice Chairman:	W. Reed Johnson, University of Virginia
Secretary:	E. A. Straker, SAI, Huntsville
Treasurer:	James H. Renken, Sandia
Executive Committee:	C. M. Huddleston, Naval Ordnance Lab.
(3 year terms)	Clyde Jupiter, EG&G, Inc.
	F. R. Mynatt, ORNL

CINDA 71 NOW AVAILABLE

CINDA 71, the Computer Index of Neutron Data, is an index to the literature on microscopic neutron cross sections. *CINDA* contains bibliographical references to measurements, calculations, and evaluations of neutron cross sections and other microscopic neutron data. *CINDA 71* supersedes previous editions of this Index. *CINDA 71* consists of a large volume and two supplements which cover the literature up through October 1971.

The compilation and publication of *CINDA* are the result of worldwide cooperation involving four information centers, each responsible for compiling the *CINDA* entries from literature published in a defined geographical area noted in parentheses below:

The U.S. AEC Technical Information Center, P.O. Box 62, Oak Ridge, Tenn. (United States and Canada).

The U.S.S.R. Nuclear Data Centre at the Fiziko-Energeticheskij Institut, Obninsk, Soviet Union (U.S.S.R.)

The ENEA Neutron Data Compilation Centre at Saclay, France (OECD member countries in Western Europe and Japan).

IAEA Nuclear Data Section at Vienna, Austria (all other countries in Eastern Europe, Asia, Australia, Africa, Central and South America; also IAEA publications and translation journals).

In addition to the published *CINDA* books, up-to-date computer retrievals for specified *CINDA* information are currently available on request. For *CINDA* computer retrievals, as well as for exchange of information, scientists should contact their appropriate centers.

For the United States and Canada:

Mr. Lawrence T. Whitehead
Science and Technology Branch, U.S. Atomic Energy Commission
Technical Information Center
P. O. Box 62, Oak Ridge, Tenn. 37830

For U.S.S.R.:

U.S.S.R. Nuclear Data Centre
Fiziko-Energeticheskij Institut
Obninsk, Soviet Union (U.S.S.R.)

For other OECD countries:

Centre ENEA de Compilation de Donnees Neutroniques
B.P.9, F-91 Gif-sur-Yvette, France

For all other countries:

IAEA Nuclear Data Section
Karntner Ring 11
A-1010 Vienna, Austria

ANNOUNCEMENT

A new code package and an updated data package are announced as available.

CCC-177/DOPEX	Laminated Shield Weight Optimization Code - Steepest Descent Calculation Method, contributed by NASA Lewis Research Center, Cleveland, Ohio. Reference: NASA TM X-2554. FORTRAN IV, IBM-360/75/91.
DLC-12D/POPLIB	Has been updated. Data set 928902 has been voided and data set 928903 has been added. There are now a total of 244 data sets currently in DLC-12D. One reel of tape is needed for transmittal.

RSIC BIBLIOGRAPHIES AND ABSTRACTS

A limited number of the following volumes of bibliographies and abstracts published by RSIC are available on request:

ORNL-RSIC-5, Vol. II and III - Bibliography, Subject Index, and Author Index of the Literature Examined by the Radiation Shielding Information Center (Reactor and Weapons Shielding). (Vol. I may be obtained from the National Technical Information Service, Dept. of Commerce, Springfield,Va. 22151.)

ORNL-RSIC-6, Vol. I and II - Abstracts of the Literature Examined by the Radiation Shielding Information Center (Reactor and Weapons Shielding)

ORNL-RSIC-11 (Rev. II) - Bibliography, Subject Index, and Author Index of the Literature Examined by the Radiation Shielding Information Center (Space and Accelerator Shielding) (May 1970)

ORNL-RSIC-12 - Abstracts of the Literature Examined by the Radiation Shielding Information Center (Space and Accelerator Shielding (Rev. Sept. 1970)

ORNL-RSIC-13, Vol. I and II - Abstracts of Digital Computer Codes Assembled by the Radiation Shielding Information Center - Betty F. Maskewitz

ORNL-RSIC-15 - Bibliography of the Computer Codes Literature Examined by the Radiation Shielding Information Center - Betty F. Maskewitz, Vivian A. Jacobs, Jane Gurney (July 1967)

PERSONAL ITEMS

Tom E. Albert, formerly with the Nuclear Technology Group, Martin-Marietta, Orlando, Florida, is now with SAI, Huntsville, Alabama.

Clyde Jupiter of EG&G has recently moved from Albuquerque to Las Vegas to manage the EG&G Radiation and Environmental Science Department.

Robert W. Deutsch is leaving his position as professor and chairman of the Department of Nuclear Science and Engineering at Catholic University to become president and chief executive of General Physics Corporation, the Columbia, Md., firm which he founded.

R E M I N D E R

FOURTH INTERNATIONAL CONFERENCE
ON REACTOR SHIELDING

Paris, France
9th-13th October 1972

VISITORS TO RSIC

Visitors to RSIC during the month of May were: Ralph Best, Nuclear Fuel Services, Rockville, Md.; Don Bogart and Irving Karp, NASA Lewis Research Center, Cleveland, O.; B. W. Colston, USAEC, Kansas City, Mo.; Dent Davis, USAEC, Oak Ridge, Tenn. L. G. DeViedma, ENEA Computer Programme Library, Ispra, Italy; J. H. Fain and B. L. Peele, Duke Power Co., Charlotte, N. C.; Rosalind Huang, NUS Corp., Rockville, Md.; Luigi Lesca, CCDN/ENEA, Saclay, France; E. Matney, Information Division, ORNL, Earl McDow, ORAU, Oak Ridge, Tenn.; E. E. Morris, University of Notre Dame, Indiana; P. K. Patwardhan, Bhabha Research Center, Bombay, India; R. J. Quirk, Bendix Corp., Kansas City, Mo.; L. P. Smith, Colad, Inc., Buffalo, N. Y.

MAY ACCESSION OF LITERATURE

REACTOR AND WEAPONS SHIELDING

AECL-1027(6th Ed.)
Health and Safety Organization. Sixth Edition.
Atomic Energy of Canada Ltd., Ottawa(Ontario)
1971,August
NTIS

ANL-7714
ARC System Cross-Section Homogenization and Modification Capabilities.
Kovalsky, E.A.; Zapatka, J.; Henryson II, H.; Hoover, J.; Walker, P.M.
1971,June
NTIS

ANL-7853
Energy-Dependent Transport Theory with a Separable Kernel. (Based on Thesis)
Larson, H.A.
1971, October
NTIS

BLG-454
Development and Improvement of a New In-Pile Technique of Neutron Spectrometry Based on the (n,p) Collision.
de Leeuw-Gierts, G.; de Leeuw, S.
1971,April
Centre d'Etude de l'Energie Nucleaire, Brussels, Belgium

BNL-50316
Dose Distribution, Dose Uniformity, and Minimum Dose Data for Square Cesium-134 Source Plaques.
Galanter, L.
1971,November
NTIS

BNL-50317
Tabulated Dose Uniformity Ratio and Minimum Dose Data - Rectangular Cobalt-60 Source Plaques.
Galanter, L.
1971,December
NTIS

BNL-50318
Tabulated Dose Distribution Data - Rectangular Cobalt-60 Source Plaques.
Galanter, L.
1971,December
NTIS

BNL-50319
Tabulated Dose Uniformity Ratio and Minimum Dose Data Rectangular Cesium-137 Source Plaques.
Galanter, L.
1971,December
NTIS

BNL-50320
Tabulated Dose Distribution Data - Rectangular Cesium-137 Source Plaques.
Galanter, L.
1971,December
NTIS

BRL-1572
A Standardized Autoradiographic Neutron Detection System.
Jacobson, J.R.; Fuller, P.E.
1972,March
NTIS

CONF-700659, pp.2-3
Standards and Their Dissemination in the Field of Radiation Measurement.
Jennings, W.A.
1971
Slough, Eng.: United Kingdom Panel on Gamma and Electron Irradiation(1971)

CONF-700659, pp.24-9
Gamma Ray Dose Distributions in Non-Uniform Materials.
Zanelli, G.D.
1971
Slough, Eng.; United Kingdom Panel on Gamma and Electron Irradiation(1971)

CONF-700708-(Vol.2), pp.329-43
Geometrical Factor for Collimated Detectors.
Iglesias, G.E.; Ortiz de Adler, N.
1970
La Paz, Dolivia; Univ. Mayor de San Andres

CONF-701219(Vol.2), pp.173-6
Compton Scattering by K-Shell Electrons at Large Scattering Angle.
Krishna Reddy, D.V.; Murty, D.S.R.
1970
Bombay; Dept. of Atomic Energy

CONF-70219(Vol.2), pp.177-81
Inelastic Scattering of Gamma Rays by K-Shell Electrons.
Krishna Reddy, D.V.; Narasimhacharyulu, E.; Murty, D.S.R.
1970
Bombay; Dept. of Atomic Energy

CONF-701219(Vol.2), pp.183-6
Analytical Formulation of K-Shell Photo-Effect.
Biswas, M.; Roy, S.C.; Ghose, A.M.
1970
Bombay; Dept. of Atomic Energy

CONF-701219(Vol.2), pp.513-17
Effect of Absorber Thickness on Narrow-Beam-Collimated Geometry Condition.
Gopal, S.; Sanjeevaiah, H.; Sanjeevaiah, B.
1970
Bombay; Dept. of Atomic Energy

DNA-2831F
A Re-Analysis of Secondary Gamma-Ray Spectra Produced in Liquid Nitrogen by 14 MeV Neutrons. Final Report May 3,1971 Through September,1971.
Reynolds, G.M.; Sperling, S.M.
1972,March
Science Applications,Inc., P.O.Box 2351, La Jolla, Calif.

EGG-1183-2264
Effects of Thickness, Absorbed Dose Rate, and Total Dose on Plastic Scintillator Light Emission.
Stevens, J.; Janee, H.S.
1971,June

EIR-194
Investigation of Corrosion Phenomena at Shielding in Radiation Channel of Nuclear Reactors.
Hermes, E.; Gamsjaeger, H.; Peng, K.; Widder, F.
1971,February
NTIS

GULF-RT-A10783
Measurement and Analysis of Neutron Spectra in a Fast Subcritical Assembly Containing 235-U, 238-U, and BeO.
Young, J.C.; Neill, J.M.; d'Oultremont, P.; Slaggie; E.L.; Preskitt, C.A.
1971,July 29
Gulf Radiation Technology, A Div. of Gulf Energy and Environmental Systems Co., P.O.Box 608, San Diego, Calif. 92112

HASL-TM-72-1
Environmental Gamma Radiation from Nitrogen-16 Decay in the Turbines of a Large Boiling Water Reactor.
Lowder, W.M.; Raft, P.D.; Gogolak, C.V.
1972,February
Health and Safety Lab., USAEC, New York, N.Y. 10014

HEDL-TME-71-33
Radiological Evaluation of a Hypothetical Core Disruptive Accident.
Fies, C.L.
1971,February
NTIS

LA-4878
Measurements of Filtered X-Ray Spectra.
Lier, D.W.; Israel, H.I.; Storm, E.
1972,March
NTIS

IEC Publication 181(In French and English)
Index of Electrical Measuring Apparatus Used in Connection with Ionizing Radiation.
Geneva; Bureau Central de la Commission Electrotechnique Internationale
1964
American National Standards Institute, N.Y.

IEC Publication 181A(In Several Languages)
Index of Electrical Measuring Apparatus Used in Connection with Ionizing Radiation.
Geneva; Bureau Central de la Commission Electrotechnique Internationale
1965
American National Standards Institute, N.Y.

IEC Publication 181B(In Several Languages)
Index of Electrical Measuring Apparatus Used in Connection with Ionizing Radiation.
Geneva; Bureau Central de la Commission Electrotechnique Internationale
1966
American National Standards Institute, N.Y.

INMAS/HP-15-70; CONF-701138-2
Dosimetry of Internal Emitters.
Reddy, A.R.
1970
INIS

JPRS-54305, pp.42-62
Effective Cross Sections of Reaction (n, 2n).
Sluchevskaya, V.M.
1969
NTIS

JUL-764-RG
Numerical Method for the Solution of the Time Dependent Transport Equation for Neutrons.
Lindenmayr, G.
1971,May
NTIS (U.S.Sales Only)

JUL-765-RG
Method for the Numerical Solution of the Linear Position Dependent Boltzman Equation in Spherical Geometry and Spherical Symmetry.
Wolf, L.
1971,May
NTIS (U.S.Sales Only)

JUL-766-CT
Energy Accumulation in Solid Bodies Through Nuclear Radiation by Storage of Highly Radioactive Scrap.
Laser, M.; Merz, E.
1971,May
NTIS (U.S.Sales Only)

JUL-814-RX (In German)
A Method for Calculating Intermediate Neutron Spectra by Foil Activation.
Borchardt, G.
1971,December

LA-tr-71-74
Radiative Capture of Neutrons by 241-Am.
Dovbenko, A.G.; Ivanov, V.I.; Kolesov, V.E.; Tolstikov, V.A.
1969
Dep., NTIS

NBS-10838(Thesis)
Calculation of Neutron Penetration in an Infinite Concrete and Air Medium.
Simmons, G. L.
1972
The Catholic University of America Press, Washington, D.C.; National Bureau of Standards

ORNL-4765 and Add.
An Evaluation of Neutron and Gamma-Ray-Production Cross Sections for Lead.
Fu, C.Y.; Perey, F.G.
1972,March
NTIS

ORNL-4780
Neutron Elastic- and Inelastic-Scattering Cross Sections for Oxygen in the Energy Range 4.34 to 8.56 MeV.
Kinney, W.E.; Perey, F.G.
1972,April
NTIS

ORNL-RSIC-30, Vol.I
Abstracts of the Data Library Packages Assembled by the Radiation Shielding Information Center.
Roussin, R.W.
1972,March
RSIC

ORNL-TM-3270; CTC-41
The Relative Importance of Neutron Capture and Inelastic-Scattering Interactions to the Secondary Gamma-Ray Dose Transmitted Through Laminated Tungsten and Lithium Hydride SNAP Reactor Shields.
Pace, J.V.,III; Mynatt, F.R.; Abbott, L.S.
1972,April 12

ORNL-TM-3551
1970 Intercomparison of Nuclear Accident Dosimetry Systems at the Oak Ridge National Laboratory.
Haywood, F.F.
1972,February

ORNL-TM-3641
Radiation Properties of Spent Plutonium Fuels.
Bell, M.J.
1972,January

ORNL-TM-3754
The Effect of the Ground on the Steady-State and Time-Dependent Transport of Neutrons and Secondary Gamma Rays in the Atmosphere.
Straker, E.A.
1972,March 21

RFP-1700
Rocky Flats Technical Datasheets of Materials Properties.
Jackson, R.J.(Ed.)
1971
Dow Chemical, Rocky Flats Div., P.O.Box 888, Golden, Colorado 80401

RD/B/N-2034
Delta Spectrometer Results on Water Reactor Shields.
Longworth, J.P.
1971,June
NTIS (U.S.Sales Only)

UCI-1971-1
Gamma Transition Energies of the Major Fission Products.
Grant, P.M.; Miller, G.E.; Rowland, F.S.
1971,November
Nuclear Reactor Facility, Dept. of Chemistry, University of California, Irvine

USNRDL-TR-69-60
Exposure Rates from the Products of Thermal-Neutron Fission of 235-U at Selected Times after Fission.
Bunney, L.R.; Sam, D.
1969

Acta Electron., 13(4), 293-303 (In French)
Neutron Generators.
Eschard, G.
1970, October

Acta Electron., 13(4), 317-64 (In French)
Sealed Tube Pulse Neutron Generators.
Faure, C.
1970,October

Atomkernenergie, 18(1), 25-29
Determination of Intermediate Neutron Energy Spectrum for a Pool-Type Reactor.
Weng, P.S.; Lee, M.H.
1971,January

Atomkernenergie, 18(1), 71-78 (In German)
Investigations on the Primary Reactor Shielding of the Nuclear Ship "Otto Hahn".
Fiebig, P.; Frisins, F.; Hackbarth, H.; Richter, Cr.
1971,January

Atomkernenergie, 18(4), 321-
Calculated Response of Film Badge and Fission Fragment Track Dosimeters with Indium and Cadmium Filters to Intermediate Neutrons.
Gomaa, M.A.
1971

Atompraxis, 13, 131-134
Measurement of Gamma Radiation Conduction in a Tube with a Constant Curvature.
Herre, F.; Roesinger, S.K.
1971,March

Geofiz. App., 44, 148-150 (In Russian)
Neutron Yield in Sealed-Off Accelerators.
Ab, Z.A.; Khutsishbili, L.A.
1970

Health Phys., 21(4), 602-605
Distribution of Radiation Exposure within the Plane of a Circular Line Source.
Miller, A.L.; Tanaka, M.; Cember, H.
1971,October

Health Phys., 21(6), 851-853
Determination of Unique HVT Inherent Filtration and f Factors from Measured X-Ray Spectra.
Balasubrahmanyam, V.
1971,December

Isotope Radiat. Res., 4, 1-7
Neutron Transmission Through Air-Filled Ducts in Water Shields.
Mohammed, F.; Belov, S.; Megahid, R.; Hamouda, I.
1971,June

Izv. Vyssh. Ucheb. Zaved., Fiz., No.3, 65-68 (In Russian)
Calculation of a Gamma-Radiation Field by the Monte Carlo Method for Statistically Inhomogeneous Media.
Kol'chuzhkin, A.M.; Uchaikin, V.V.
1971

J. Belge Radiol., 54(4), 515-522 (In French)
Concrete Examples of Integral Absorbed Doses.
Bercy, A.
1971,July-August

J. Korean Nucl. Soc., 3(3), 155-160
Average and Effective Energies, and Fluence-Dose Equivalent Conversion Factors for 239-Pu-Be, 241-Am-Li, and 241-Am-F Neutron Sources.
Ro, S.G.; Yoo, Y.S.
1971,September

J. Nucl. Energy, 26(3), 141-
Transport-Theory Calculation of Neutron-Flux, Disadvantage Factors and Effective Diffusion-Coefficients in Square Cells and Slabs.
Williams, M.M.; Wood, J.
1972

J. Nucl. Sci. Technol.(Tokyo), 9(1), 36-
Eigenvalue Spectrum of Neutron-Transport Operator for a Fast Multiplying System.
Ukai, S.; Hiraoka, T.
1972

Kernenergie, 14(10), 317-325
Neutron Embrittlement of Steels and Its Effect on Vessels of Pressurized-Water Reactors.
Bergemann, W.
1971

Kernenergie, 14(11), 360-363
Neutron Routine Dosimetry Using Solid-State Track Detectors.
Dorschel, B.
1971

Kernenergie, 15(1), 9- (In German)
Concrete Shields in Rheinsberg Nuclear-Power Plant.
Gerullis, W.; Michaelis, U.E.
1972

Nucl. Instrum. Methods, 96(4), 515-524
"Shelled Activation Detectors" for the Measurement of Neutron Spectra Especially at Kilovolt Energies.
Henninger, R.J.; Amster, H.; Binney, S.E.; Mark, H.
1971, November

Nucl. Instrum. Methods, 96(4), 551-555
Measurements and Calculations of Neutron Detector Efficiencies.
Thornton, S.T.; Smith, J.R.
1971, November

Nucl. Sci. Eng., 46(3), 416-421
Neutron Diffusion from a Fast Point Source in Aqueous Absorbing Solutions.
Nguyen, D.H.; Slayton, M. T.; Frew, J. A.
1971,December

Nucl. Sci. Eng., 48(1), 10-15
A Generalized Model for the Elastic and Inelastic Slowing Down of Fast Neutrons.
Rocca-Volmerange, B.
1972,May

Nucl. Sci. Eng., 48(1), 16-27
Synthesis of Three-Dimensional Transport Problems Using Two-Dimensional Trial Functions.
Natelson, M.
1972,May

Nucl. Sci. Eng., 48(1), 51-71
The Spectral Distribution of Neutrons and Neutron Reaction Cross Sections in an Unreflected Uranium-235 Critical Assembly and the Fission Neutron Spectrum.
McElroy, W. N.; Armani, R.J.; Tochilin, E.
1972,May

Nucl. Technology, 12(2), 235-240
Experimental Measurement of Gamma Heat in the High Flux Isotope Reactor.
Senn, R.L.; Mixon, W.R.
1971,October

Nucl. Technology, 14(2), 197-199
Measurement of the Uranium-235 Content in a Spent MTR Type Fuel Element Using the Delayed-Neutron Yield Technique.
Augustson, R.H.; Henry, C.N.; Weisbin, C.R.
1972,May

Phys. Rev. C, 5(3), 836-845
Gamma-Ray Multiplicity in Decay of Residual Nuclei from Nuclear-Reactions.
Degnan, J.H.; Cohen, B.L.; Petty, R.C.; Fink, C.L.; Rao, G.R.; Balasubramanian, R.
1972

Senpaku Gijutsu Kenkyujo Hokoku, 8(2), 33-56
(In Japanese)
Buildup Factors for Rectangular Slab Shields.
I. Multiple Scattering Model for Gamma Rays and
Application to Rectangular Slab Shields.
Yamakoshi, H.
1971,March

BOOK (In Russian)
Transport of Fast Neutrons in Plane Shields.
Germogenova, T. A.
1971
Moscow, Atomizdat

SPACE AND ACCELERATOR SHIELDING

ANL/HEP-7107, pp.1-34
Proton-Proton Interactions Between 90 and 800 GeV/c: Experimental Results from Echo Lake Cosmic Ray Studies.
Lyon, D.E.,Jr.
1970,November 19
Dep., NTIS

CONF-690979, last paper in conf.
Establishment of Suitable Neutron Fluxes for Whole-Body Neutron Activation Analysis, Using a Cyclotron as a Neutron Source.
Chamberlain, M.S.; Fremlin, J.H.; Holloway, I.
1969
London; Medical Research Council

COO-3506-1
Experimental Studies of Elementary Particle Interactions at High Energies. Technical Progress Report.
Cool, R.L.
1972
NTIS

IHEP-71-81 (In Russian)
Intranuclear Cascade in Concrete Shielding of the 70 GeV Proton Synchrotron.
Britvich, G.I.; Getmanov, V.B.; Lebedev, V.N.; Malkov, V.V.; Sychev, B.S.
1971
Institute of High Energy Physics, Serpukhov

IHEP-71-84 (In Russian)
On Radiation Passing Through the Labyrinth of the IHEP 70 GeV Synchrotron.
Borodin, V.E.; Obryashikova, L.P.; Chimankov, M.N.
1971
Institute of High Energy Physics, Serpukhov

IHEP-71-96 (In Russian)
On Investigation of Nucleon-Meson Cascade in Shielding Materials.
Endovitsky, V.S.; Kimmel, L.R.; Mochov, N.V.; Britvich, G.I.; Lebedev, N.V.
1971
Institute of High Energy Physics, Serpukhov

LA-4824, pp.59-62; CONF-710828, pp.59-62
Monitoring Pions with Scattering Reactions.
Minehart, R.C.
1971,November
Dep., NTIS

LA-4824, pp.67-70; CONF-710828, pp.67-70
Pion Intensity Measurements by the Decay Method.
Mutchler, G.S.
1971,November
Dep., NTIS

LA-tr-72-3
Monte Carlo Calculations of Electron-Photon Cascade Showers in Lead. Captions of Tables Only.
Akademiya Nauk SSR, Leningrad, Fiziko-Technicheskii Institute
No Date
Dep., NTIS

N72-18704
Penetration of Particles in Matter. A Monte Carlo Method.
Budal, K.
1970,September
NTIS

N72-18799
Isotopic Composition of the Primary Cosmic Radiation.
Dauber, P.M.(Ed.)
1971,August
NTIS

NASA-TN-D-6695; MSC-S-222; N72-18797
Radiation Dosimetry for the Gemini Program.
Richmond, R.G.
1972,March
NTIS

CRC Crit. Rev. Environ. Contr., 2(2), 147-205
Radiation Protection Standards. Part 2.
Taylor, L.S.
1971,August

J. Geophys. Research, 74(26), 6494-6496
Structure in the Fast Spectra of Atmospheric Neutrons.
Wilson, J.W.; Lambiotte, J.J.; Foelsche, T.
1969

J. Phys., D, 5(1), 43-58
Penetration and Energy-Loss Theory of Electrons in Solid Targets.
Kanaya, K.; Okayama, S.
1972,January

Nucl. Instrum. Methods, 86, 217-220
Two Dimension Calculations of the Energy Density Distribution in Tin from an 8 GeV Pion Beam.
O'Brien, K.
1970

Nucl. Instrum. Methods, 99(1), 5-12; ORNL-TM-3437; N72-17782
Nucleon and Charge-Pion Albedo Spectra in an Accelerator Cave from 200 GeV Proton Interactions in Iron.
Gabriel, T.A.; Santoro, R.T.
1972

Physical Rev. C, 2(2), 621-631
Bremsstrahlung and Photoneutrons from Thick Tungsten and Tantalum Targets.
Berger, M.J.; Seltzer, S.M.
1970

Phys. Lett., 38A(4), 267-268
Z sub 2 Dependence of Stopping Cross Sections for Low-Energy Alpha Particles.
Chu, W.K.; Powers, D.
1972,February 14

Phys. Rev. D, 4(11), 3388-3418
Inclusive Processes at High Transverse Momentum.
Berman, S.M.; Bjorken, J.D.; Kogut, J.B.
1971,December 1

BOOK, pp.75-157
High-Energy Interactions in Space. In: Elementary Particles. Science, Technology, and Society.
Kirsten, T.A.; Schaeffer, O.A.
1971
New York, Academic Press Inc.

COMPUTER CODES LITERATURE

AD-736 203 December 1971 OCD
A Discussion and Tabulation of the Data Used to Construct the Charts in the OCD Standard Method for Fallout Gamma Radiation Shielding Analysis
by Bramlitt, E.T.; Eisenhauer, C.M.
Office of Civil Defense, Washington, D.C.

AI-AEC-13018 March 1972 SCORE-III-A
SCORE-III-A: An Interactive Display System for Evaluation of Multilevel Resonance Parameters in the Adler Format
by Rose, P.F.
Atomics International, Canoga Park, Calif.
FORTRAN IV; IBM 360
AVAIL: NTIS

DP-1276 (ENDF-158) October 1971 THERMOS
Testing of ENDF/B-THERMOS Cross Sections for H2O,D2O, C,ZrH2, (C2H4)x, Be, BeO, C6H6 and UO2.
by McCrosson, F.J.; Finch, D.R.; Olson, E.C.
Savannah River Lab., DuPont de Nemours and Co., Aiken S.C.
AVAIL: Dep.,NTIS

JAERI-1219 June 1971 PEACO
PEACO: A Code for Calculation of Group Constants of Resonance Energy Region in Heterogeneous Systems
by Ishiguro,Y; Takano, H.
Japan Atomic Energy Research Institute, Tokyo, Japan
FACOM-230/60 FORTRAN
AVAIL: Dep., NTIS (U.S. Sales Only)

LA-4600 March 1972 TWOTRAN
Theory and Use of the Spherical Harmonics First Collision Source, and Variable Weight Versions of the TWOTRAN Transport Program
by Lathrop, K.D.; Brinkley, F.W.; Rood,P.
Los Alamos Scientific Lab., Los Alamos, N. Mex.
FORTRAN; CDC 6600
AVAIL: NTIS

LA-4708-MS June 1971 DCHAIN
DCHAIN: A PDP-9/PDP-15 Computer Program for Radioactive Decay and Capture Chain Calculations
by East, L.V.
Los Alamos Scientific Lab., Los Alamos, N. Mex.
FORTRAN IV; PDP-9,PDP-15
AVAIL: Dep., NTIS

LA-DC-13269(CONF-711125-8) November 1971 ATR
Multigroup Monte Carlo and S/sub n/ Methods for Air Transport
by Harris, D.R.; Koenig, D.R.; Preeg, W.
Los Alamos Scientific Lab., Los Alamos, N. Mex.
FORTRAN; CDC 6600
AVAIL: Dep., NTIS

NASA-TM-X-2554 April 1972 DOPEX
The DOPEX Code: An APplication of the Method of Steepest Descent to Laminated-Shield-Weight Optimization with Several Constraints
by Lahti, G.P.
NASA - Lewis Research Center, Cleveland, Ohio
FORTRAN IV; IBM 7094-II
AVAIL: NTIS

NSSDC 72-12 February 1972 ALLMAG,GDALMG,LINTRA
ALLMAG, GDALMG, LINTRA: Computer Programs for Geomagnetic Field and Field-Line Calculations
by Stassinopoulos, E.G.; Mead, G.D.
National Space Science Data Center, NASA - Goddard Space Flight Center, Greenbelt, Md.
FORTRAN IV; IBM 360
AVAIL: NTIS

ORNL-TM-1950 (Rev. 2) March 1972 WEIGHT
Program WEIGHT: A FORTRAN IV Program for Evaluation of Weighting Functions Used in Small-Angle X-Ray Scattering
by Hendricks, R.W.
Oak Ridge National Lab., Oak Ridge, Tenn.
FORTRAN IV; IBM 360
AVAIL: Dep., NTIS

RD/B/N-2150 November 1971 COFOCO 2
COFOCO 2: A Program for the Analysis of Foil Activation Experiments
by Waterson, R.H.
Central Electricity Generating Board, Berkeley, England
AVAIL: Dep., NTIS (U.S. Sales Only)

RT/FI(71)29 October 1971 DIRCO
DIRCO: A FORTRAN Program for Calculation of Dipole Radiative Capture Cross Section According to Direct And Collective Models
by Fabbri, F.; Longo, G.; Saporetti, F.
CNEN-Centro Di Calcolo, Bologna, Italy
FORTRAN IV; IBM 360
AVAIL: Dep., NTIS (U.S. Sales Only)

RT/FI(71)30 October 1971 SPEC
SPEC: A Computer Program for Analysis of Gamma-Ray Spectra From Radiative Nucleon Capture
by Fabbri, F.; Longo, G.; Saporetti, F.
CNEN-Centro Di Calcolo, Bologna, Italy
FORTRAN IV; IBM 360
AVAIL: Dep., NTIS (U.S. Sales Only)

RT/FI-(71)31 October 1971 KISS
KISS: A FORTRAN Code for Quadrupole Direct Radiative Capture Cross Section Calculation
by Fabbri, F.; Longo, G.; Saporetti, F.
CNEN-Centro Di Calcolo, Bologna, Italy
AVAIL: Dep., NTIS (U.S. Sales Only)

UCID-30023 September 1971 BUCKLE
User's Manual for The BUCKLE X-Ray Deposition Program
by Edwards, A.L.
Lawrence Livermore Lab., Livermore, Calif.
FORTRAN; CDC 6600
AVAIL: Dep., NTIS

WCAP-7835 January 1972 LOCTA-R2
LOCTA-R2 Program: Loss of Coolant Transient Analysis
by Bezella, W.A.; Caso, C.L.; Spencer, A.C.
Westinghouse Electric Corp., Pittsburgh, Pa.
FORTRAN IV; CDC 6600
AVAIL: NTIS