

# 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. 71

October 1970

*Give me the liberty to know, to utter,  
and to argue freely according to conscience  
above all liberties.*

- John Milton (1644)

## RSIC SPACE-ACCELERATOR BIBLIOGRAPHY AND ABSTRACTS ISSUED

The report by M. P. Guthrie, R. G. Alsmiller, Jr., Jane Gurney, and Ann B. Gustin, "Bibliography, Subject Index, and Author Index of the Literature Examined by the Radiation Shielding Information Center (Space and Accelerator Shielding)", ORNL-RSIC-11 (Rev. 2) has just been issued. The bibliography, containing 685 references indexed according to subject category, replaces ORNL-RSIC-11 (Rev. 1) issued in 1967.

Additional abstracts for the ORNL-RSIC-12 binder, consistent with the bibliography, are also now available. The abstracts are filed in sequence according to the RSIC accession number. Normally, the bibliography is used to locate abstracts of interest in ORNL-RSIC-12.

## CONFERENCE ON NEW DEVELOPMENTS IN REACTOR MATHEMATICS AND APPLICATIONS

Papers are invited for the above named topical meeting to be held in Idaho Falls, Idaho, March 29-31, 1971. Sessions topics include Monte Carlo Method, Reactor Safety Calculations, Deterministic Transport Calculations, ENDF/B and Associated Process Data Codes, and Model Programming Systems. Papers on other reactor computation problems are encouraged. Summaries (400-600 words) should be mailed before November 1, 1970 to Dr. Ely Gelbard, Bettis Atomic Power Laboratory, Box 79, West Mifflin, Pa. 15122.

ANNUAL REPORT OF  
ORNL NEUTRON PHYSICS DIVISION  
Now Available

The "Neutron Physics Division Annual Progress Report for the Period Ending May 31, 1970," ORNL-4592, has now been issued. The report is composed of a wide variety of abstracts and summaries on neutron cross sections, reactor and weapons radiation shielding, theoretical studies for medium- and high-energy radiation shielding, and medium-energy nucleon spectroscopic studies. In addition, RSIC operations and progress are summarized. Copies are available from ORNL and CFSTI.

DO YOU HAVE A PROBLEM FILING SDI CARDS?

The Selective-Dissemination-of-Information (SDI) computer program has recently been extended to provide summary cards which list the abstracts being sent by accession number for each subject category. An example is shown below.

626 DR. NICK TSOULFANIDIS

07-07-70

WE SUGGEST FILING THESE CARDS BY ABSTRACT (ACCESSION) NUMBER AND KEEP THIS CARD FOR MANUAL SEARCHES BY CATEGORY. THE ABSTRACT NUMBERS ARE ORGANIZED BY THE CATEGORY NUMBERS OF THE SEARCH PROFILE WHICH RESULTED IN OUTPUT.

CAT NO 111000	CAT NO 212200	CAT NO 222200
654	666	660
CAT NO 121000	CAT NO 213100	CAT NO 223200
654	656	665 669
CAT NO 212100	CAT NO 213200	
657 658 659	653	

We suggest the summary cards be used in the following manner:

- (1) File abstracts cards by abstract (accession) number.
- (2) Collect summary cards at front of file.
- (3) Retrieve abstracts by subject by consulting summary cards which list abstract number by subject category.

We hope this will do the trick.

RSIC  
MONTE CARLO SEMINAR-WORKSHOP  
HELD OCTOBER 5 - 7

One hundred eighteen participants from 53 separate installations, including four foreign countries, attended the Monte Carlo seminar-workshop held at the Oak Ridge National Laboratory over the three-day period, October 5-7. Co-sponsors were the Reactor and Weapons Radiation Shielding Group (Neutron Physics Division, ORNL) and Mathematical Applications Group, Inc. (MAGI), White Plains, New York.

Five papers on general Monte Carlo theory were presented, 6 Monte Carlo code systems were discussed, and the remaining papers were discussions of specific applications. Following the seminar part of the meeting a workshop on the computer code ANTE was conducted by Martin Cohen of MAGI, and on the third day of the meeting a workshop on the computer code MORSE was presented by C. E. Burgart, E. A. Straker, Peggy Emmett, and V. R. Cain, ORNL.

J. W. Curlin, ORNL, spoke at a dinner meeting on the evening of October 5 on the topic "Must We Play Monte Carlo with our Environment." C. W. Craven, Jr. presided.

CFSTI NOW NTIS

Effective September 2, 1970, the Clearinghouse for Federal Scientific Technical Information (CFSTI) was renamed the National Technical Information Service. It is no longer associated with the National Bureau of Standards. The complete address which is to appear in place of the currently used CFSTI address is:

National Technical Information Service  
U. S. Department of Commerce  
Springfield, Virginia 22151

TABLE 1.  
(continued)

DATA LIBRARY DESIGNATION	CONTRIBUTOR	FORM	DATA TYPE/COMPUTER CODE/COMMENT
DLC-10/AVKER	ORNL-N	Magnetic tape	Data library of neutron fluence-to-kerma factors for many elements. The retrieval program will compute energy group values for any composition for use with group fluence to calculate dose or heating (ORNL-TM-2558). Energy range: 19.2 MeV to 0.023 eV.
DLC-11/RITTS	ORNL-R, ORNL-N, CTC	Magnetic tape	100-group neutron, 21-group gamma-ray, $P_3$ expansion, coupled cross sections for H, C, O, N, Na, Mg, P, S, Cl, K, and Ca. The 100-group neutron set is also provided. Also, 121 group coupled, $P_3$ , macroscopic data for standard man, skin, bone, tissue, brain, lung, red marrow, and muscle. Data format ANISN/DOT/MORSE. Energy range: neutron; 15 MeV to thermal, gamma-ray: 14 MeV to 0.01 MeV. (ORNL-TM-2991).
DLC-12/POPLIB	CTC, ORNL-N	Magnetic tape	A compendium of neutron induced secondary gamma-ray yield and production cross-section data. Data library for PSR-11/POPOP4 code. Original library has 139 data sets (CTC-42).
DLC-13/GARLIB	NASA-LE	Magnetic tape	32 group resonance region neutron capture and scattering cross sections for moderated tungsten and uranium slabs. Produced by the GAROL code. Group fluxes calculated by GAROL are also included for further collapsing of the group structure. Energy range: 1.234 keV to 0.414 eV. (NASA TM X-1909).
DLC-14/AIR	ORNL-N CTC	Cards	22-group neutron, 18-group gamma-ray $P_5$ expansion, coupled cross sections for air. Data format for ANISN/DOT/DTF-IV/MORSE. Compiled by E. Straker and M. L. Gritzner for calculation of neutron and secondary gamma ray transport in infinite homogeneous air. (ORNL-4464).

LIBRARY CONTRIBUTORS

CTC Computing Technology Center, Union Carbide Corporation, Oak Ridge, Tenn.  
 NASA-LE NASA Lewis Research Center, Cleveland, Ohio.  
 ORNL-N Oak Ridge National Laboratory, Neutron Physics Div., Oak Ridge, Tenn.  
 ORNL-R Oak Ridge National Laboratory, Reactor Div., Oak Ridge, Tenn.  
 IRL Lawrence Radiation Laboratory, Livermore, Calif.

REVISION OF SECOND PAGE OF TABLE 1  
(AUGUST NEWSLETTER)

### PERSONAL ITEMS

K. J. (Jack) Yost has left ORNL and is now with the Purdue University Department of Nuclear Engineering.

\* \* \* \* \*

Major George Conner, U.S. Army, was recently assigned to DASA with responsibilities in weapons fallout. Also newly assigned to DASA is Captain Dean Kaul, U.S. Air Force. Captain Kaul, who recently completed his Masters Degree in nuclear engineering, will have responsibility for the radiation shielding program. Major Richard Enz, who formerly held this position, has transferred to the AFWL and is working in the underground test programs.

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Dr. Y. T. Song is teaching in the School of Architecture at the University of Colorado. He was formerly with TVA.

\* \* \* \* \*

W. M. Cegelski is now located at Redondo Beach, with TRW.

### VISITORS TO RSIC

Visitors to RSIC during the month of September were: Joan Brooks, Mathematical Applications Group, Inc., White Plains, N. Y.; E. R. Cohen, North American Rockwell Corp., Thousand Oaks, Calif.; H. Goldstein, Columbia University, New York, N. Y.; L. Harris, Gulf Radiation Technology, San Diego, Calif.; H. E. Hootman, Savannah River Laboratory, Aiken, S. C.; P. B. Hemmig, USAEC, Washington, D.C.; J. A. Lonergan, Science Applications, Inc., La Jolla, Calif.; Leona Stewart, Los Alamos Scientific Laboratory, Los Alamos, N. M.; B. R. Sehgal, Argonne National Laboratory, Argonne, Ill.; H. W. Redmond, Ridge Instrument Co., Inc., Oak Ridge, Tenn.; N. M. Schaeffer, Radiation Research Associates, Fort Worth, Tex.

### SEPTEMBER ACCESSION LIST OF LITERATURE

The RSIC is now aware of the literature cited in the following list. This literature has either been obtained by RSIC or has been placed on order. When received, this material will be examined and assigned to various files if suitable for our information system. The accession list is divided into three fields (1) reactor and weapons shielding, (2) space and accelerator shielding, and (3) shielding computer codes. These titles are announced before processing and indexing so that there will be no delay and can serve as a prompt announcement of current literature.

RSIC is not a documentation center. Copies of the literature cited must generally be obtained from the author or from a documentation center such as the National Technical Information Service, Springfield, Virginia, 22151.

RSIC maintains a microfiche file of literature entered into its information system. Computer searches of this system (which produces a special bibliography) and duplicate microfiche copies of the literature in our files are available upon request. Naturally, we cannot supply copies of literature which is copyrighted (such as books or journal articles) or whose distribution is restricted. Neither service is available for the codes literature.

### REACTOR AND WEAPONS SHIELDING

AFRRI SR68-1

January 1968

The Radiation Environment Above an Air-Ground Interface Covered with Co-60

C. W. Garrett

Avail: Armed Forces Radiobiology Research Institute, Defense Atomic Support Agency, Bethesda, Md. 20014

AHSB(S) R 184

1970

Use of the U. K. Nuclear Data Library in the Monte Carlo Program  
MONK

P. J. Hemmings

Avail.: Authority Health and Safety Branch, Risley, Warrington, Lancashire, England

BRL-1476

February 1970

Fallout Migration from a Sloped Roof

J. C. Maloney, A. S. Miller

Avail.: CFSTI as AD-703856

BRL-TN-1731

March 1970

A Concept for the Measurement of Gamma-Ray Spectra from Pulsed Reactors or Flash X-Ray Machines

W. R. Van Antwerp

CONF-690331

1969

Lead Shielding and Nuclear Safety Conference, 1969. Proceedings of Conference, London, 25-27 March 1969.

Avail.: Lead Development Association, London

CONF-690548 (In Japanese and English)

1969

Proceedings of the 9th Japan Conference on Radioisotopes, May 13-15, 1969, Tokyo, Japan

Avail.: Japan Atomic Industrial Forum, Inc., Tokyo

CONF-700502, pp. 74-85

May 1970

Penetrating Radiation Dose Rates and Shield Requirements in Fabrication of Fuels Containing 233-U and High Exposure Plutonium  
M. J. Bell, J. P. Nichols  
(From Symposium on Sol-Gel Processes and Fuel Cycles, May 4-7, 1970)

CTC-42

September 10, 1970

The POPOP4 Library of Neutron-Induced Secondary Gamma-Ray Yield and Cross Section Data  
W. E. Ford, III  
Avail.: CFSTI

DASA 2401-1 (GA-9751-Vol. I)

November 17, 1969

Time-Dependent Fast Neutron and Secondary Gamma-Ray Spectrum Measurements in Concrete. (Final Report March 1, 1968 Through November 15, 1969) - Volume I.  
L. Harris, Jr., H. Kendrick, Y. D. Naliboff, S. M. Sperling

DASA 2401-2 (GA-9751-Vol. II)

November 17, 1969

Time-Dependent Fast Neutron and Secondary Gamma Ray Spectrum Measurements in Concrete - Final Report March 1, 1968 Through November 15, 1969. Volume II.  
L. Harris, Jr., H. Kendrick, Y. D. Naliboff, S. M. Sperling

DP-1232

April 1970

Estimation of <sup>252</sup>Cf Shielding Requirements  
H. E. Hootman  
Avail.: Dep.; CFSTI

DP-Report-175 (CONF-630511-10)

April 1963

Progress in Shielding Design in the Dragon Project  
Project Dragon  
D. B. Crawley  
Avail.: Dep.; CFSTI

GA-10135

May 22, 1970

Energy Deposition Studies. Three-Year Summary Report Ending August 31, 1970  
D. A. Vroom

ICRU-16

June 15, 1970

Linear Energy Transfer  
International Commission on Radiation Units and Measurements,  
Washington, D. C.  
Avail.: ICRU Publications, Washington, D.C.

- ICRU-17 June 15, 1970  
Radiation Dosimetry: X-Rays Generated at Potentials of 5 to 150 kV  
International Commission on Radiation Units and Measurements,  
Washington, D. C.  
Avail.: ICRU Publications, Washington, D.C. \$2.50
- NCG-TM-67-1 1967  
Prediction of Gamma Exposure Rates in Large Nuclear Craters  
T. M. Tami, W. C. Day  
Avail.: Dep; CFSTI
- NEDO-13074 June 1970  
A Theoretical Photon Transport Representation of Strongly Collimated  
Gamma Scan Experiments (GE-APED PROGRAM HOTROD, 15 November 1969)  
M. R. Egan  
(General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.)
- NP-9742 (DP-Report-6) November 1960  
Preliminary Shielding Report for the Dragon Reactor Experiment.  
Project DRAGON  
D. B. Crawley  
Avail.: Dep.; CFSTI
- ORNL-TM-2891 (ENDF-138) September 10, 1970  
Evaluation of the Cross Sections of Iron: ENDF/B MAT 1101  
D. C. Irving, E. A. Straker
- ORNL-TM-3065 July 29, 1970  
Status of Neutron Transport in the Atmosphere  
E. A. Straker  
Avail.: Dep.; CFSTI
- ORNL-TM-3098 August 24, 1970  
The Low-Energy Neutron Spectrum of the ORNL Tower Shielding Reactor  
Beam  
R. M. Freestone, Jr., F. J. Muckenthaler, K. M. Henry, Jr., C. E.  
Clifford
- ORNL-TR-2112 (*Atompraxis*, 74 (9/10); 426-28 (1968) (In German)  
Increase of Dose Rate by Erection of a Radiation Shield  
E. Sauter
- Atompraxis*, 16, 117-119 (Mar.-April 1970) (In German)  
"Plaster of Boron," A Neutron Shielding Material  
H. H. Ertl, M. Bodemann, W. Puetz, L. von Erichsen

- Brit. J. Radiol.*, 43(511), 448- (1970)  
Exposure Rates from Diagnostic X-Ray Units  
E. C. McCullough, J. R. Cameron
- Health Phys.*, 19(1), 59-60 (1970)  
Linear Absorption Coefficients for Gamma Rays in Tissue  
H. L. Smith, R. D. Neff
- Kerntechnik*, 12, 165-70 (April 1970) (in German and English)  
Monalite Shielding Materials on a Ceramic Basis  
H. Schumann
- J. Appl. Phys.*, 41(7), 3178-3181 (1970)  
X-Ray Attenuation Cross Sections of Air Between 0.1 keV and 1 MeV  
W. J. Veigele
- Kernenergie*, 13(6), 172- (1970) (In German)  
Gamma-Ray Shielding by High-Density Concretes with Densities from  
3.2 up to 3.8 g/cm<sup>3</sup>  
F. W. Kruger
- Nucl. Appl. Tech.*, 9(3), 439-441 (September 1970)  
Gamma-Ray Buildup Factor Coefficients for Concrete and Other  
Materials  
D. K. Trubey
- Nucl. Appl. Tech.*, 9(4), 591-604 (October 1970)  
Analysis of Gamma-Ray Spectroscopy Data  
J. A. Baran, R. S. Reynolds, R. E. Faw, W. R. Kimel
- Nucl. Appl. Tech.*, 9(4) 454-507 (October 1970)  
Neutron-Energy Spectra for Fast Reactor Irradiation Effects  
D. Okrent, W. B. Loewenstein, A. D. Rossin, A. B. Smith
- Nucl. Instr. Methods*, 79(2), 233-9 (March 15, 1970)  
Computer Analysis of Nuclear Spectra and Gamma-Energy Standards  
J. Kern
- Nucl. Sci. Eng.*, 41(2), 155-163 (August 1970)  
Primary-Recoil Atom Spectra from ENDF/B Data  
J. D. Jenkins
- Nucl. Sci. Eng.*, 41(2), 237-248 (August 1970)  
Truncation Error Analysis of Finite Difference Approximations to the  
Transport Equation  
W. H. Reed, K. D. Lathrop

- Soviet J. At. Energy (English Transl.)*, 26(4), (April, 1969)  
Green's Function for Neutron Transport Problems with Cylindrical Symmetry. (Abstract)  
N. I. Laletin
- Soviet J. At. Energy (English Transl.)*, 26(4), 421-422 (April 1969)  
Reconstruction of a Fast Neutron Reactor Spectrum from Threshold Detector Data. (Abstract)  
A. A. Chernoyarskii, V. S. Medik, A. M. Zaitov, V. I. Kukhtevich
- Soviet J. At. Energy (English Transl.)*, 26(4), 422-423 (April 1969)  
Monte-Carlo Calculation of Neutron Transmission Through Cylindrical Polyethylene Layers. (Abstract)  
G. V. Miroshnikov, A. I. Miroshnikova, I. A. Solodukhin
- Soviet J. At. Energy (English Transl.)*, 26(4), 424- (April 1969)  
Transmission of Fast Neutrons Through Lithium Hydride, Titanium, and Zirconium Shields. (Abstract)  
V. P. Gromov, Yu. F. Zubov
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Cf<sup>252</sup> Neutron Source (Letters to the Editor)  
G. N. Moshkin, N. D. Tyufakov, A. S. Shtan', V. S. Yaskevich,  
N. D. Baikalov
- Soviet J. At. Energy (English Transl.)*, 27(2), 853-854 (August 1969)  
Passage of Thermal and Intermediate Neutrons Through a Shielding Nonuniformity  
D. L. Broder, S. A. Kozlovskii, V. S. Kyz'yubov, K. K. Popkov,  
A. A. Smetanin

THESIS

1969

A Study of <sup>60</sup>Co Gamma Radiation Transport by Means of the Monte Carlo Method  
Raymond R. Nydegger  
University of Kansas, Lawrence, Kan. 66044

BOOK

1969

*The Photographic Action of Ionizing Radiation in Dosimetry and Medical, Industrial, Neutron, Auto- and Microradiography*  
R. H. Herz (England)  
Wiley-Interscience

BOOK (In Russian)

1970

*Fast Neutron Spectra Penetration in Various Materials of Nuclear Reactor Shielding*  
A. P. Veselkin, Yu. A. Egorov, I. Ya. Emel'yanov  
Moscow, Atomizdat

SPACE AND ACCELERATOR SHIELDING

- AD-705062 (N70-32755) *June 1969*  
Energy Loss of High Energy Electrons in Aluminum, Copper, and Lead  
(M.S. Thesis)  
Wood Rene De Leuil, James Bruce Ranis  
Avail.: CFSTI
- EUR-4452-d-f-e (N70-32376) *January 1970*  
Proceedings of the Second Symposium on Microdosimetry  
H. G. Ebert (ed.)  
Avail.: CFSTI - HC \$10.00/MF \$0.65
- EUR-4452-d-f-e, p. 595-613 (N70-32406) *January 1970*  
Secondary Electron Spectrum Build-Up in High-Energy Electron Radiation  
H. J. Schulz, D. Harder
- EUR-4452-d-f-e, p. 541-566 (N70-32404) *January 1970*  
Spectrum of Energy Deposited by Electrons in Spherical Regions  
J. Berger
- EUR-4452-d-f-e, p. 567-594 (N70-32405) *January 1970*  
Some General Results from the Transport Theory of Electron Absorption  
Dietrich Harder
- LA-4097-MS *December 1969*  
Thick Target Bremsstrahlung Theory  
C. R. Emigh  
Avail.; Dep.; CFSTI
- NASA-CR-102662 (N70-27513) *March 1970*  
Comparisons of Experimental and Calculated Electron Transmission and  
Bremsstrahlung Spectra for Electron Energies Below 3.0 MeV. Final  
Report, 12 Mar. 1970  
D. H. Rester  
Avail.: CFSTI
- ORNL-TM-2834 *August 1970*  
Calculated Residual Radiation Levels for Some Elements Used in  
Cyclotron Structures  
C. B. Fulmer, G. Kindred  
Avail.: Dep.; CFSTI
- ORNL-TM-2924, *Revised* *July 15, 1970*  
The Absorbed Dose and Dose Equivalent from Neutrons in the Energy  
Range 60 to 3000 MeV and Protons in the Energy Range 400 to 3000 MeV  
R. G. Alsmiller, Jr., T. W. Armstrong, W. A. Coleman  
Avail.: CFSTI

ORNL-TM-3025

August 3, 1970

The Lateral Spread of High-Energy ( $\leq 400$  MeV) Neutron Beams and Earthshine

R. G. Alsmiller, Jr., F. R. Mynatt, M. L. Gritzner, J. V. Pace, J. Barish

J. Geophys. Research, 75(22), 4357-4359 (Aug. 1, 1970)

Calculated Cosmic Ray Ionization in the Lower Atmosphere  
K. O'Brien

Nucl. Appl. Tech., 9(4), 605-614 (October 1970)  
(Condensed version of ORNL-TM-2848)

Calculation of the Long-Lived Induced Activity in Soil Produced by 200 MeV Protons  
T. A. Gabriel

Soviet J. Nucl. Phys. (English Transl.), 10(6), 693-695 (June 1970)

On the Development of the Electron-Photon Shower in the Layered Medium  
N. M. Gerasimova

#### COMPUTER CODES LITERATURE

AI-AEC-12847

June 1969

STP-1

Interim Description of a Computer Program (STP-1) for Estimating the Distribution of Fission and Corrosion Product Radioactivity in a Liquid Metal-Cooled Fast Breeder Reactor

by G. B. Zvezig and P. F. Rose  
FORTRAN IV, IBM 360

AI-AEC-12957

July 1970

STP-1

User's Manual for the Source Term Program (STP-1) for Computing the Distribution of Corrosion and Fission Products in LMFBR's

by G. B. Zvezig  
FORTRAN, IBM 360

BNWL-811

September 1968

EXDOSE

EXDOSE - A Computer Program for Calculating the External Gamma Dose from Airborne Fission Products

by M. M. Hendrickson  
FORTRAN II, IBM 7090

CTC-42

September 1970

DLC-12

POPOP4 Library

The POPOP4 Library of Neutron-Induced Secondary Gamma-Ray Yield and Cross Section Data (POPOP4 Memo No. 1)

by W. E. Ford, III

DASA 2401-1 and 2401-2  
GA-9751, Vol. I and II

November 1969

TRIPAN (Appendix A)  
FERDOR (Appendix B)

Time-Dependent Fast Neutron and Secondary Gamma-Ray Spectrum Measurements in Concrete - Final Report - Volume II, Appendix A: TRIPAN Three-Parameter Analysis Code; Appendix B: FERDOR Unfolding Code by L. Harris, Jr., H. Kendrick, Y. D. Naliboff, and S. M. Sperling  
FORTRAN, UNIVAC 1108

GA-10103

April 1970

GAPER-2D

GAPER-2D: A Two Dimensional Transport Perturbation Theory Program by R. J. Archibald and D. A. Sargis  
FORTRAN V, UNIVAC 1108

JAERI-1191

July 1970

STAX 2

STAX 2: A Computer Program for Calculating Neutron Elastic and Inelastic Scattering Cross Sections by Means of the Optical Model and Moldauer's Theory by Yoshiaki Tomita, JAERI Tokai Research Establishment  
FORTRAN, FACOM-230/60

K 69-43 (ORNL-tx-2353)

December 1969

DP1

DP1 - An ALGOL Program for the Computation of Energy Spectra of Scattered Gamma Rays in a Finite Slab Shield by S. A. W. Gerstl  
ALGOL

LA-4410

June 1970

ANDY1G2  
ANDY1R2

ANDY1G2 and ANDY1R2, Monte Carlo Programs for Time-Dependent Monoenergetic Particle Transport in General Geometries and Repeating Arrays by D. R. Harris  
FORTRAN IV, CDC 6600

MR-7003

March 1970

ANTE-BELLM

ANTE-BELLM - A Computer Program for the Solution of the Adjoint Neutron Time Dependent Transport Equation by the Monte Carlo Technique by M. O. Cohen and W. Guber  
FORTRAN IV, IBM 360

ORNL-CF-70-9-1

September 1970

SAMBO

SAMBO, A Collision Analysis Package for Monte Carlo Codes by V. R. Cain  
FORTRAN IV, IBM 360

