

MANSON BENEDICT
 DEAN BROWN
 E. RICHARD COHEN
 E. C. CREUTZ
 FRANK G. DAWSON
 O. E. DWYER
 PAUL GAST
 D. H. GURINSKY
 A. F. HENRY
 D. G. HURST
 A. A. JOHNSON
 L. W. NORDHEIM
 HUGH C. PAXTON
 FRED W. THALGOTT

ANS Officers

JOHN W. LANDIS
 President
 JAMES R. LILIENTHAL
 Vice President/President Elect
 J. ERNEST WILKINS, JR.
 Treasurer
 RAYMOND D. MAXSON
 Assistant Treasurer
 OCTAVE J. DU TEMPLE
 Executive Secretary

ANS Publications Staff

NORMAN H. JACOBSON
 Publications Manager
 RUTH FARMAKES
 Assistant Staff Editor
 KATHRYN L. FROELICH
 Copy Editor
 SIEGFRIED H. KRAPP
 Production Manager
 LINDA A. DOLBY
 Production Assistant

Composition

BELJAN, ANN ARBOR, MICH.

NUCLEAR SCIENCE AND ENGINEERING is published monthly by the American Nuclear Society, Incorporated, with executive and business offices at 244 East Ogden Avenue, Hinsdale, Illinois 60521—telephone 312/325-1991. Subscription rate is \$110/4 volumes, calendar year; \$30/single volume: Volumes 43, 44, 45 and 46 will be published during 1971: single copy price is \$13 (special issues slightly higher): address subscription orders to the American Nuclear Society (back issues of Volumes 1-17 are available from Academic Press, 111 Fifth Avenue, New York, N.Y.). Second-class postage is paid at Hinsdale, Illinois and at additional mailing offices. NUCLEAR SCIENCE AND ENGINEERING is printed in Danville, Illinois. Copyright © 1971 by the American Nuclear Society, Inc. Inquiries about the distribution and delivery of NUCLEAR SCIENCE AND ENGINEERING and requests for changes of address should be directed to the publisher, the American Nuclear Society, 244 East Ogden Avenue, Hinsdale, Illinois 60521. Allow 6 weeks for a change to become effective.

Contents

TECHNICAL PAPERS

Solution to the Linear Time-Dependent Neutron Transport Equation with Time-Dependent Source and Cross Sections *W. L. Hendry* 1

The Exact Probability Distribution of Reactor Neutron Noise.
Andreas Szeless and Lawrence Ruby 7

Activation Measurements of the Doppler Effect in Uranium-238 and Thorium-232 at High Surface-to-Mass Values. *R. N. Whitesel and R. Sher* 14

Simultaneous Measurement of the Neutron Fission and Absorption Cross Sections of Plutonium-239 Over the Energy Region 0.02 eV to 30 keV.
R. Gwin, L. W. Weston, G. De Saussure, R. W. Ingle, J. H. Todd, F. E. Gillespie, R. W. Hockenbury, and R. C. Block 25

An Integral Measurement of Plutonium-239 and Uranium-233 Alpha . . . *W. Y. Kato, R. J. Armani, R. P. Larsen, P. E. Moreland, L. A. Mountford, J. M. Gasidlo, R. J. Popek, and C. D. Swanson* 37

Photofission Cross Section of Plutonium-238 and Plutonium-239
Alvin Shapiro and Warren F. Stubbins 47

The Fuel Cycle Analysis System, REBUS
J. Hoover, G. K. Leaf, D. A. Meneley, and P. M. Walker 52

Weighting and Biasing of a Monte Carlo Calculation for Very Deep Penetration of Radiation
Jeanne-Marie Lanore 66

A Model for Thermal and Radiation Stress and Strain in Viscoelastic, Orthotropic Cylinders, and Its Application to Borated-Graphite Absorbers
D. W. Stevens and O. M. Stansfield 73

TECHNICAL NOTES

An Observation on the Material Bucklings of the Multigroup Diffusion Equations
J. H. Marable and Melvin Tobias 86

A Comparison of Measured and Calculated ²³⁹Pu, ²³⁵U, and ²³⁸U Integral Alpha Values in a Soft Spectrum Fast Critical Assembly.
M. M. Bretscher, J. M. Gasidlo, and W. C. Redman 87

Effective Atomic Numbers for Photoelectric and Incoherent Scattering Processes of Gamma Rays
K. Siddappa, A. Khayyoom, K. Parthasaradhi, and J. Rama Rao 94

Optical Detection of Boiling in Pressurized Water Reactors *J. A. Bonnet, Jr. and R. K. Osborn* 97

Anisothermal Effects During In-Pile Creep Testing of Uranium Dioxide.
W. R. D. Wilson and J. S. Perrin 99

BOOK REVIEWS 103