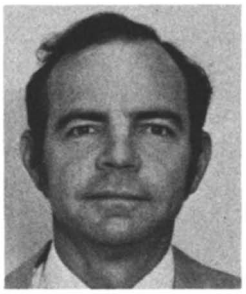
nuclear technology/fusion

SPECIAL SECTION AUTHORS — APRIL 1982

FUSION DEVICE RADIATION STREAMING AND SHIELDING

PREFACE: FUSION DEVICE RADIATION STREAMING AND SHIELDING

Bernard A. Engholm



Bernard A. Engholm (BS, California Institute of Technology, 1952) is a senior staff engineer in the Fusion Division of General Atomic Company. His work has been in the areas of neutronics, shielding design, and radiation protection for gas-cooled fission reactors and for fusion devices. During the past two years, he has been responsible for fusion engineering device nuclear analysis and for tokamak fusion test reactor lithium blanket module neutronics.

ENGINEERING TEST FACILITY VACUUM PUMPING DUCT SHIELD ANALYSIS

W. T. Urban
T. J. Seed
Donald J. Dudziak

W. T. Urban (top) (PhD, nuclear engineering, Kansas State University, 1971) is a staff member, Transport and Reactor Theory Group, at Los Alamos National Laboratory (LANL). His current interests include fusion reactor neutronics methods development, application of Monte Carlo methods to radiation transport problems, and neutron streaming through gaps and penetrations in fusion reactor shields. **T. J. Seed** (center) (PhD, nuclear engineering, University of Washington, Seattle) is a senior neutronics engineer at INESCO, Inc., in La Jolla, California. For six years he worked on neutral particle transport methods and code development at LANL. He is currently engaged in design analysis of the INESCO RIGGATRON™ Tokamak Development Project. **Donald J. Dudziak** (bottom) (PhD, mathematics; MS, physics; BS, engineering) is presently on sabbatical leave from his position as group leader for the Transport and Reactor Theory Group at LANL in order to pursue fusion reactor systems research at the Swiss Federal Institute for Reactor Research. His other research interests include radiation shielding, fusion nucleonics, Monte Carlo theory, and sensitivity theory.

RADIATION STREAMING CALCULATIONS FOR INTOR-J

Yasushi Seki
Hiromasa Iida
Robert T. Santoro
Hiromitsu Kawasaki
Michinori Yamauchi

Yasushi Seki (right) (BS, nuclear engineering, 1967, and Dr. Eng., nuclear engineering, 1977, University of Tokyo) is senior scientist in the Division of Thermonuclear Fusion Research at the Japan Atomic Energy Research Institute (JAERI). His work has been in the area of fast breeder reactor nuclear design. His interests are in nuclear design and shielding analysis of

fusion reactors, and analysis of neutronics integral experiments related to fusion reactors. **Hiromasa Iida** (top right) (BS, nuclear engineering, University of Tokyo, 1968) is a research scientist in the Division of Thermonuclear Fusion Research at JAERI. His interest has been in the nuclear design of fusion reactors, especially induced activity analysis and Monte Carlo calculations. He is presently in the process of obtaining a doctorate from the University of Tokyo for his work in the Monte Carlo code development. His recent work deals with the thermal and mechanical design of fusion reactors. **Robert T. Santoro** (top left) (MS, University of Tennessee, 1967) is a member of the Engineering Physics Division at Oak Ridge National Laboratory (ORNL). His current interests are in neutron transport and neutron interactions with matter related to fusion reactor design. He is currently involved in the neutronic investigations of reactor blanket and shield design, neutral beam injectors, radiation streaming from penetrations, radiation effects in materials, and the analysis of integral experiments for fusion reactor shields. **Hiromitsu Kawasaki** (bottom right) (graduate, information engineering, Nippon Electronics College, 1976) is a software programmer at Century Research Center Corporation, Ltd. His work has been in the area of software development for fusion reactor neutronics analysis and criticality analysis. **Michinori Yamauchi** (bottom left) (MS, Nagoya University, 1977) is a research staff member in the Nuclear Engineering Department at NAIG Nuclear Research Laboratory of Nippon Atomic Industry Group Co., Ltd. His work has been in the area of radiation transport methods development and radiation shielding calculations and analyses for fusion reactors and integral experiments. He was a visiting scientist at ORNL during 1981.




NEUTRON STREAMING ANALYSIS FOR SHIELD DESIGN OF THE FUSION MATERIALS IRRADIATION TEST FACILITY

L. L. Carter

L. L. Carter (PhD, University of Washington, 1969) is a fellow engineer in the Radiation and Shield Analysis Group at Hanford Engineering Development Laboratory (HEDL). Prior to joining HEDL in 1977, he was the alternate group leader of the Monte Carlo Group at Los Alamos National Laboratory. He co-authored the Energy Research and Development Administration Critical Review Series book, *Particle-Transport Simulation with the Monte Carlo Method*. Current interests include neutronics and shielding for fusion facilities and fast breeder reactors, and the development and application of the Monte Carlo method.

PROMPT AND DELAYED RADIATION SHIELDING CALCULATIONS FOR THE ZEPHYR DEUTERIUM-TRITIUM IGNITION EXPERIMENT

G. Prillinger
A. Fischer
Eva Fischer
H. Krause



G. Prillinger (top) (PhD, Institut für Kernenergetik und Energiesysteme, Universität Stuttgart) started in the field of neutron and electron cancer therapy treatment planning. He has been involved in shielding calculations for gas-cooled and light water reactors. Current interests include fusion neutronics and radiation damage analysis. **A. Fischer** (center) (physics, State University of Leningrad, 1968) was involved in neutron activation and unfolding calculations, reactor kinetics, and theoretical investigations of the reactivity measurement. Present activities include transport calculations for shielding problems and radiation damage analysis. **Eva Fischer** (bottom) (bio-

physics, State University of Leningrad, 1971) started with mathematical modeling of biological processes, especially in the area of enzyme kinetics. Later on, she switched over to reactor physics and was involved in transport and activation calculations. Present activities include reactor accident and core-melting calculations. **H. Krause** (right) (PhD, physics, Technische Hochschule München, 1974) was responsible for radiation transport calculations and shielding outlays for the ignition experiment ZEPHYR at IPP Garching. Since termination of this project, his effort has been in neutronics analysis for the Garching developments of Joint European Torus diagnostics.

NEUTRONIC CALCULATIONS FOR THE TOKAMAK FUSION TEST REACTOR DIAGNOSTIC PENETRATIONS

Long-poe Ku
Joseph G. Kolibal

Long-poe Ku (top) (BS, nuclear engineering, National Tsin-hua University, Taiwan, 1970; MS, 1973, and PhD, 1976, nuclear engineering, Columbia University) is a staff member at Princeton Plasma Physics Laboratory (PPPL). He has been with the tokamak fusion test reactor (TFTR) and TFM design team since 1978 where he is responsible for nuclear radiation analysis and shielding design. His current interests include neutron physics, transport theory, fusion neutronics, and fusion reactor system analysis. **Joseph G. Kolibal** (BS, chemical engineering, Carnegie-Mellon University, 1974; MS, nuclear engineering, Imperial College, University of London, 1977) is a staff member at PPPL engaged in nuclear radiation analysis and transport. He is responsible for assessment of the radiological and shielding environment for the TFTR and the TFM. His current interests include the development and application of computational techniques for transport phenomena.

NEUTRON AND GAMMA-RAY STREAMING CALCULATIONS FOR THE ENGINEERING TEST FACILITY NEUTRAL BEAM INJECTORS

R. A. Lillie
R. T. Santoro
R. G. Alsmiller Jr.
J. M. Barnes

R. A. Lillie (top right) (PhD, University of Tennessee, 1975) is a research staff member in the Engineering Physics Division at the Oak Ridge National Laboratory (ORNL). His work has been in the areas of fission reactor core physics and shielding analysis. His current interests focus on the application of radiation transport methods to fusion reactor neutronics problems. **R. T. Santoro** (top left) (MS, University of Tennessee, 1967) is a member of the Engineering Physics Division at ORNL. His current interests are in neutron transport and neutron interactions with matter related to fusion reactor design. He is currently involved in the neutronic investigations of reactor blanket and shield design, neutron beam injectors, radiation streaming from penetrations, radiation effects in materials, and the analysis of integral experiments for fusion reactor shields. **R. G. Alsmiller Jr.** (bottom right) (PhD, University of Kansas, 1957) is leader of the Applied Physics and Fusion-Reactor Analysis Group of the Engineering Physics Division at ORNL. For several years he has directed the theoretical research in this division in the areas of high energy nuclear reactions, high energy nuclear transport, and fusion reactor neutronics. **J. M. Barnes** (bottom left) (BS, University of Arkansas, 1965) is a member of the Computer Sciences Division at ORNL. He is involved in the neutronic analysis of fusion reactor blankets and shields, neutral beam injectors, radiation effects in materials, and the analysis of integral experiments for fusion reactor shields.