nuclear technology/Fusion

SPECIAL SECTION AUTHORS — MARCH 1983

COMPUTATIONAL METHODS FOR FUSION PLASMA ENGINEERING

RADIO-FREQUENCY HEATING AND NEUTRAL ATOM TRANSPORT IN A FLUID-MAGNETOHYDRODYNAMIC TREATMENT OF BURNING TOKAMAK PLASMAS

R. W. Conn
T. K. Mau
A. K. Prinja

R. W. Conn (top) (PhD, California Institute of Technology, 1968) spent one year at the Joint Euratom Nuclear Research Center at Ispra, Italy, and a year at the Brookhaven National Laboratory before joining the University of Wisconsin (UW) in 1970. While at UW, he served as a professor of nuclear engineering and as director of the Fusion Engineering Program. Since 1980, he has been a member of the University of California, Los Angeles (UCLA) faculty as a professor of engineering and applied science. His primary research interests include fusion reactor physics and technology, plasma physics, neutron transport and nuclear reactor physics, reactor plasma analysis, and surface physics. **T. K. Mau** (center) (PhD, electrical engineering, UW, 1977) is currently an assistant research engineer in the Fusion Engineering and Physics Program at UCLA. He spent two years (1978/1979) as a research associate in the Nuclear Engineering Department at UW in Madison. His main research interests include wave propagation and heating in reactor plasmas, antenna design, radio-frequency current drive, and numerical modeling. **A. K. Prinja** (bottom) (PhD, nuclear engineering, University of London, 1980) is currently an assistant research engineer in the Fusion Engineering and Physics Program at UCLA. His primary research interests include modeling of tokamak edge plasmas, physics of pumped limiters (theory and experiment), and application of kinetic theory to neutral atom transport in plasmas and to ion/solid interactions.

ONE-DIMENSIONAL AND $1\frac{1}{2}$-DIMENSIONAL PROFILE CALCULATIONS IN TOKAMAK PLASMAS

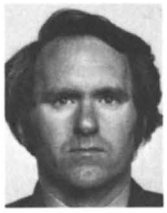
David C. Baxter
Nelson Byrne

David C. Baxter (photograph not available) (BA, Cornell University, 1966; MS, 1968, and PhD, 1974, University of California-San Diego) joined Science Applications, Inc., in 1974 and has participated in several studies involving ionospheric physics and the physics of magnetic fusion energy. Current research includes cost-scaling studies of deuterium-deuterium-fueled tokamak reactors and assessment of advanced fuel mirror reactors. Closely related work has included use of the $1\frac{1}{2}$-dimensional DDMAK tokamak reactor simulator code in studies

of advanced fuel tokamak reactors. **Nelson Byrne** (photograph not available) holds degrees in physics from Caltech and Stanford. His career has been devoted to the use of computer codes to model complicated systems, first at Lawrence Livermore National Laboratory and, for the last 11 years, at Science Applications, Inc. Noting that his work on the DDMAK code grew out of an earlier effort on a two-dimensional plasma transport code that, reflecting the less ambitious programs of earlier days, lacked thermonuclear burn capability, he hopes the reality of fusion power will also grow out of current experiments.

TRANSPORT SIMULATION OF MAGNETOHYDRODYNAMIC EFFECTS IN TOKAMAKS

Wayne A. Houlberg
John T. Hogan



Wayne A. Houlberg (top) (BS, 1970; MS, 1972; and PhD, 1977, nuclear engineering, University of Wisconsin) has been a member of the Fusion Energy Division at Oak Ridge National Laboratory (ORNL) for six years. His primary research interest is in the development of computational models for tokamak plasma behavior and the extension of these models to reactor conditions. **John T. Hogan** (BS, aeronautical Engineering, St. Louis University, 1962; PhD, astronautical sciences, Northwestern University, 1967) has been a member of the Fusion Energy Division at ORNL since 1970. Research interests include fusion plasma transport and stability analysis.

NUMERICAL STUDIES OF IMPURITIES IN FUSION PLASMAS

Russell A. Hulse

Russell A. Hulse (PhD, physics, University of Massachusetts) joined the Princeton Plasma Physics Laboratory (PPPL) in 1977 after work in the field of radio astronomy. His research at PPPL involves the study and computational modeling of impurity ion atomic processes and transport in fusion plasmas.

COMPUTATIONAL METHODS FOR FAST-ION SLOWING USING A UNIFIED SLOWING DOWN THEORY

Chan K. Choi
Ming-Yuan Hsiao

Chan K. Choi (top) is an assistant professor in nuclear engineering and the assistant director of the Fusion Studies Laboratory at the University of Illinois at Urbana-Champaign. He devotes much of his research efforts to theoretical and computational fusion plasma engineering and is currently responsible for the coordination of the NMFECC RUSS computer unit at the University of Illinois. His current research topics include charged-particle slowing down in fusion plasmas, micro- and gross instability problems in tokamaks and compact tori, and the A-FLINT target studies of the advanced-fuel inertial confinement fusion. **Ming-Yuan Hsiao** [BS, nuclear engineering, National Tsing Hua University, Republic of China, 1976; MS, nuclear engineering, University of Illinois at Urbana-Champaign (UI), 1980] is a doctoral candidate in the nuclear engineering program at UI. His current research is mainly in particle transport in field-reversed configurations.

OPTIMIZATION OF A BUNDLE DIVERTOR FOR THE FUSION ENGINEERING DEVICE

Lee M. Hively
Kristin E. Rothe
Michael Minkoff

Lee M. Hively (top) (BS, engineering science, and BS, mathematics, 1970, Pennsylvania State University; MS, physics, 1971, and PhD, nuclear engineering, 1980, University of Illinois) is a fusion plasma physicist employed by General Electric Company at the Fusion Engineering Design Center (FEDC) at Oak Ridge National Laboratory (ORNL). From 1971 to 1974 he was a member of the research staff at Western Electric Company, Princeton, New Jersey, and later obtained a U.S. patent (#3,944,963) as a result of his work in millimetre waveguide processing. His current research interests include high energy fusion-product transport in tokamaks, bundle divertor optimization, and plasma performance in the Fusion Engineering Device (FED). **Kristin E. Rothe** (center) (BS, mathematics and physics, University of Wisconsin-River Falls, 1974) is a computer analyst in the Computer Sciences Division of ORNL. She is involved in magnetohydrodynamic equilibrium calculations with applications to tokamak poloidal field systems, tokamak system modeling, and is computer coordinator for the FEDC, overseeing the engineering test facility account with the NMFECC. **Michael Minkoff** (bottom) (BS, mathematics, University of Wisconsin, 1966; MSE, aeronautical engineering, Princeton University, 1968; MS, 1970, and PhD, 1973, computer science, University of Wisconsin) is a computer scientist in the Mathematics and Computer Science Division at Argonne National Laboratory. His interests deal with the numerical solution of optimization and differential equation problems, particularly those problems involving both optimization and differential equations, e.g., FED design. He is the author of several software packages including DISPL (for solving chemical kinetics problems) and VMCON (for solving constrained optimization problems).

APPLICATION OF PARTICLE SIMULATION CODES TO FUSION REACTOR ENGINEERING

E. C. Morse
A. Drobot
A. Friedman
B. McNamara

E. C. Morse (right) (BS and PhD, University of Illinois) is presently an assistant professor of nuclear engineering at the University of California at Berkeley. Photographs and biographies of **A. Drobot, A. Friedman**, and **B. McNamara** were not available at the time of publication.

CALCULATION OF ENERGY TRANSPORT BY CYCLOTRON RADIATION IN FUSION PLASMAS

Stephen Tamor

Stephen Tamor (BS, City College of New York, 1944; PhD, University of Rochester, 1950) joined Science Applications, Inc., in 1971 where he has worked on the dynamics of laser-heated plasmas and developed a very detailed treatment of the non-LTE ionization kinetics and resulting x-ray emission. Since 1973 he has been a member of the Laboratory for Applied Plasma Studies and is engaged primarily in studies of the SNECTR code. His current interests include the investigation of cyclotron radiation, the development and application of controlled thermonuclear reactor codes, and the study of energetic electron ring formation by electron cyclotron resonance heating.

COMPUTATIONAL METHODS FOR MIRROR REACTORS

R. S. Devoto

Photograph and biography were not available at the time of publication.

NUMERICAL MODELING OF ELMO BUMPY TORUS PLASMAS

Michael R. Gordinier

Michael R. Gordinier [PhD, nuclear engineering, University of Wisconsin (UW), 1980] spent several years with the Fusion Design Group at the UW before joining the ELMO Bumpy Torus staff of Oak Ridge National Laboratory in 1980. In addition to being a current member of the physics staff at McDonnell Douglas, he is spending a year with the U.S. Department of Energy's Mirror Confinement Division as a tandem mirror technical monitor. His primary research interests include fusion reactor physics and technology, computational plasma anaysis, and plasma/surface interactions.