Fusion technology™

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EXPERIMENTAL DEVICES

STUDIES OF A FLEXIBLE HELIAC CONFIGURATION

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T. C. Hender (top right) (PhD, London University, United Kingdom, 1981) is a staff member at Culham Laboratory in the United Kingdom and was formerly a member of the theory section in the Fusion Energy Division of Oak Ridge National Laboratory (ORNL). He has worked on the theory of magnetohydrodynamic (MHD) behavior of stellarators, tokamaks, and reversed-field pinches, and currently works mainly on theoretical and interpretive studies for the Joint European Torus experiment. **J. L. Cantrell** (top left) (BS, University of Tennessee, 1983) is a staff member in the Computing and Telecommunications Division of ORNL. He has worked on the stellarator configuration studies, and is presently working in the areas of automated data acquisition and manufacturing control. **J. H. Harris** (second from top right) (PhD, University of Wisconsin, 1981) is a research staff member at ORNL. His research interests include the design of stellarator configurations and experimental studies of fluctuations and confinement. He has worked on stellarator experiments in the United States, the USSR, and Japan. **B. A. Carreras** (second from top left) is a Martin-Marietta corporate fellow at ORNL. He has worked in MHD theory and applications to tokamaks, stellarators, and reversed-field pinches. **V. E. Lynch** (third from top right) (MS, University of Tennessee, 1979) is a staff member in the Computing and Telecommunications Division of ORNL. She has contributed in the areas of stellarator design and MHD calculations for stellarators and tokamaks. **J. F. Lyon** (third from top left) (PhD, University of Tennessee, 1970) is stellarator program coordinator in the Fusion Energy Division of ORNL. His current activities are in stellarator confinement and reactor studies. He has worked in the mirror and tokamak programs at ORNL and on tokamak and stellarator programs in the USSR, France, the United Kingdom, Japan, and the Federal Republic of Germany. **J. A. Fabregas** (bottom right) (MS, Madrid University, Spain, 1983) is a staff member of the Computer Division of the Centro de Investigaciones Energeticas, Medio-ambientales y Tecnologicas (CIEMAT), Madrid, Spain, where he has been responsible for developing the computer network and data management system for the TJ-I tokamak and development and implementation of codes for the design of the TJ-II stellarator. **J. Guasp** (bottom left) (PhD, Madrid University, Spain, 1961) leads the plasma theory section at CIEMAT,

and is a deputy member of the EURATOM Fusion Program Committee. His research interests are in the areas of transport in tokamaks, stellarator configuration evaluation, and nuclear physics. **A. Lopez-Fraguas** (top) (PhD, Madrid University, Spain, 1982) is a staff member in the plasma theory section at CIEMAT. His research interests are in the areas of stellarator equilibrium and high-energy physics. **A. P. Navarro** (bottom) (PhD, Madrid University, Spain, 1973) leads the plasma experimental section at CIEMAT, and is a member of the EURATOM Fusion Program Committee. His research interests are in the areas of X-ray imaging, fluctuation, and instability studies in toroidal plasmas, and noise analysis in fission reactors.

FAST ALPHA DIAGNOSTICS USING PELLET INJECTION

Raymond K. Fisher
J. Stephen Leffler
Arthur M. Howald
Paul B. Parks

Raymond K. Fisher (top right) (BS, physics, Massachusetts Institute of Technology, 1965; PhD, physics, California Institute of Technology, 1970) joined GA Technologies, Inc. (GA) in 1971 and began working on fusion plasma diagnostics for the Doublet series of tokamaks. He is in charge of diagnostics development in the applied physics department at GA. **J. Stephen Leffler** (top left) (BS, physics, Wright State University, 1978; PhD, physics, Stanford University, 1986) has been involved in fusion diagnostics relevant to alpha particles since joining GA in 1986. His thesis research was in experimental high-energy physics at SLAC and DESY. **Arthur M. Howald** (bottom right) (AB, physics, Oberlin College, 1977; PhD, physics, University of Wisconsin at Madison, 1983) was a postdoctoral researcher at Oak Ridge National Laboratory before joining GA, where his background in atomic physics has been used in a number of plasma physics projects. **Paul B. Parks** (bottom left) (BS, physics, University of Illinois, 1971; PhD, nuclear engineering, University of Illinois, 1976) has worked on a number of diverse theoretical problems and is one of the leading experts on pellet ablation modeling in plasmas.

PLASMA ENGINEERING

PLASMA TRANSPORT IN A COMPACT IGNITION TOKAMAK

Clifford E. Singer
Long-poe Ku
Glenn Bateman

Clifford E. Singer (top) (FBIS, PhD, University of California, Berkeley) has worked on the theory and applied physics of plasma transport in tokamak experiments and reactors at Princeton Plasma Physics Laboratory (PPPL) and the University of Illinois since 1977. He has published studies of space and planetary physics, interstellar propulsion and communication, and molecular biology and evolution. **Long-poe Ku** (center) (BS, nuclear engineering, National Tsin-hau University, Taiwan, 1970; MS, 1973, and PhD, 1976, nuclear engineering, Columbia University) is a staff member at PPPL. He has been with the tokamak fusion test reactor 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. **Glenn Bateman** (bottom) (PhD, Princeton University, 1970) was

an associate professor of nuclear engineering at the Georgia Institute of Technology and is presently at PPPL. As a physicist at Oak Ridge National Laboratory from 1974 to 1979, he wrote a number of research papers and a book on magnetohydrodynamic instabilities in tokamaks. His more recent interests concern the effect of coil configurations on the magnetic field in tokamaks.

TRANSPORT SIMULATION OF A FIELD-REVERSED CONFIGURATION PLASMA

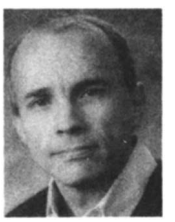
D. E. Shumaker

D. E. Shumaker (BS, nuclear engineering, University of Florida, 1970; PhD, applied science, University of California, Davis, 1977) is a computational physicist at the National Magnetic Fusion Energy Computer Center at Lawrence Livermore National Laboratory. His work has been in the area of numerical calculation of axisymmetric equilibria of compact torus plasmas. He has also developed transport codes for compact torus plasmas.

FUSION REACTORS

ON THE SELECTION OF THE OPTIMUM DESIGN CHOICE FOR THE ENGINEERING TEST REACTOR: A METHODOLOGY FOR MAKING THE BEST RATIONAL TECHNICAL DECISION

L. John Perkins



L. John Perkins (BSc, physics, 1974; MSc, nuclear engineering, 1975; and PhD, physics, 1978, University of Birmingham, United Kingdom) is a physicist in the Magnetic Fusion Energy Division at Lawrence Livermore National Laboratory (LLNL). He spent 1 year on the academic staff at the University of Birmingham undertaking research in experimental neutron physics allied to fusion blanket design followed by 2 years as a senior physicist at IRT Corporation in the same research area. Following this, he spent 3 years as a staff scientist in the Fusion Engineering Program at the University of Wisconsin in the field of conceptual fusion reactor design. His primary research interests at LLNL include plasma engineering, fusion reactor design, advanced fusion energy conversion concepts, advanced tokamak fueling methods, and physics and engineering scoping studies of tokamak engineering test reactors. He is currently one of the U.S. participants in the International Thermonuclear Experimental Reactor design study.

ICF TARGETS

RADIOLOGICAL DOSE CALCULATIONS FOR THE DIODE REGION OF THE LIGHT ION FUSION TARGET DEVELOPMENT FACILITY

Douglass L. Henderson
Mohamed E. Sawan
Gregory A. Moses

Douglass L. Henderson (right) [BS, nuclear engineering, University of Arizona, 1978; MS, nuclear engineering, University of Wisconsin (UW), 1979] is currently working on his PhD degree at UW. His research interests include inertial confinement fusion (ICF) reactor technology and time-dependent neutron transport

theory. He worked for $3\frac{1}{2}$ years in the ICF group at Kernforschungszentrum Karlsruhe. **Mohamed E. Sawan** (top) (BS, nuclear engineering, University of Alexandria, Egypt, 1967; MS, 1971, and PhD, 1973, nuclear engineering, UW) is associate scientist in the Fusion Engineering Program at UW. He worked as assistant and associate professor in the Department of Nuclear Engineering at the University of Alexandria for 7 years. Current interests are centered on design and neutronics of both magnetic confinement and ICF reactors. **Gregory A. Moses** (bottom) (PhD, nuclear engineering, The University of Michigan, 1976) is a professor of nuclear engineering and engineering physics at UW. His research interests include ICF reactor technology, radiation hydrodynamics, and transport theory. He has recently worked on the application of supercomputers to engineering problems.

TRITIUM SYSTEMS

TWO-DIMENSIONAL CROSS-SECTION SENSITIVITY AND UNCERTAINTY ANALYSIS FOR TRITIUM PRODUCTION RATE IN FUSION-ORIENTED INTEGRAL EXPERIMENTS

Yujiro Ikeda
Mahmoud Z. Youssef

Yujiro Ikeda (top) (PhD, nuclear engineering, Nagoya University, Japan, 1981) is a research scientist in the Department of Reactor Engineering at Japan Atomic Energy Research Institute. He has worked in the area of the fusion neutronics experiments, fusion dosimetry, and cross-section measurements. **Mahmoud Z. Youssef** (PhD, nuclear engineering, University of Wisconsin, 1980) is currently a member of the research staff of the Fusion Engineering Program at the University of California, Los Angeles. He spent 1 year at the Casaccia Nuclear Study Center in Italy. His research interests include pure fusion and hybrid engineering and technology, radioactivity and safety analysis, sensitivity and perturbation theory, and neutronics methods for fusion and fission reactors.

BLANKET ENGINEERING

HEAT TRANSFER FOR FUSION COMPONENT APPLICATIONS

Ronald D. Boyd

Ronald D. Boyd (BS, mechanical engineering, Tuskegee Institute, 1968; PhD, mechanical engineering, University of Michigan, 1976) is chairman of the Department of Mechanical Engineering at Prairie View A&M University. He is currently conducting research on high heat flux removal from fusion reactor, space cold plate, and electronic components. Additional fundamental research is being conducted on natural convection in enclosures and mixed convection. For the past 12 years, he has been a principal investigator and heat transfer consultant for the high heat flux materials and fusion component development, the liquid-metal fast breeder reactor spent-fuel transportation, the waste isolation pilot plant, and reactor safety programs. From 1968 to 1971, he was a research engineer at Los Alamos National Laboratory. His interests include theoretical and experimental (including optical) analyses of thermal transport processes.

A PHENOMENOLOGICAL MODEL FOR PREDICTION OF CRITICAL HEAT FLUX UNDER HIGHLY SUBCOOLED CONDITIONS

Joel Weisman
Shahab Ileslamlou

Joel Weisman (top) (PhD, University of Pittsburgh) is professor of nuclear engineering and director of the Laboratory of Basic and Applied Nuclear Research at the University of Cincinnati. Previously, he spent 18 years in industry, his last position being manager of thermal and hydraulic analysis for Westinghouse Corporation, Pressurized Water Reactor Division. **Shahab Ileslamlou** (BS, mechanical engineering, University of North Carolina, 1982; MS, mechanical engineering, North Carolina A&T University) is a doctoral student in the nuclear engineering program at the University of Cincinnati.