fusion technology™

AUTHORS — MARCH 1992

PLASMA ENGINEERING

RIPPLE-ASSISTED FUELING IN TOKAMAK REACTORS

Keiji Tani
Ryuji Yoshino
Takashi Tuda
Tomonori Takizuka
Masafumi Azumi

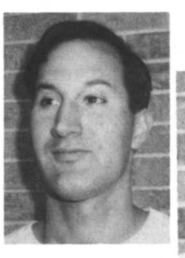
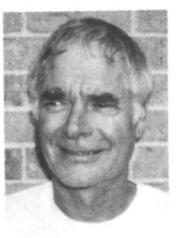



Keiji Tani (top right) (BS, 1971, and PhD, 1984, nuclear engineering, Osaka University, Japan) is a principal scientist in the Large Tokamak Experimental Division II of the Japan Atomic Energy Research Institute (JAERI). His current work is in the area of high-energy particle physics. **Ryuji Yoshino** (top left) (BS, 1975; MS, 1977; and PhD, 1980, Tokyo University, Japan) is a senior scientist in the Large Tokamak Experiment Division I at JAERI. He has been a physics operator of JT-60 and JT60-U. His interests include the control of plasma configuration and density to improve the plasma performance. **Takashi Tuda** (photo not available) (MS, 1971, and PhD, 1981, electrical engineering, Kyoto University, Japan) is a principal scientist in the Plasma Theory Laboratory in the Department of Fusion Plasma Research at JAERI. His major activities are in the transport process in tokamak plasma. **Tomonori Takizuka** (bottom right) (BS, 1970; MS, 1972; and PhD, 1975, Kyoto University, Japan) is a senior scientist in the Plasma Theory Laboratory in the Department of Thermonuclear Fusion Research at JAERI. He has worked on tokamak physics theory. His interests include alpha-particle transport, divertor plasma, and confinement theory. **Masafumi Azumi** (bottom left) (MS, electrical engineering, Kyoto University, Japan, 1969) is the general manager of the Large Tokamak Experimental Division II at JAERI. He is responsible for directing activities related to experimental analysis in JT-60.

FUSION FUEL CYCLES

AN ASSESSMENT OF THE FEASIBILITY OF FUELING A TOKAMAK REACTOR WITH LITHIUM TRITIDE PELLETS

S. C. McCool
P. H. Edmonds
G. G. Castle

S. C. McCool (left) (BSc, physics, University of Illinois, 1974; PhD, physics, University of Texas-Austin, 1982) is currently studying low-Z pellet injection and the effects of magnetic perturbation on plasma transport on the Texas Experimental Tokamak (TEXT). He previously performed Thomson scattering measurements on the Alcator-C tokamak at the Massachusetts Institute of Technology (MIT). **P. H. Edmonds** (right) (BSc, University of London, United Kingdom, 1960; PhD, atomic physics,

University College, London, United Kingdom) is primarily responsible for the design and construction of the TEXT upgrade program at the University of Texas–Austin. Previously, he worked as a research associate at MIT and was part of the fusion research program at Oak Ridge National Laboratory. His other interests include operations and diagnostics. **G. G. Castle** (right) (BSc, physics, Louisiana State University, 1987) is working toward a PhD in physics at the University of Texas–Austin. His research involves the study of impurity pellet ablation dynamics on TEXT.

FIRST-WALL TECHNOLOGY

THE DESIGN OF LOW-ACTIVATION STEELS FOR A FUSION REACTOR FIRST WALL: A PROPOSAL FOR A NEW AUSTENITIC ALLOY

Mario Merola
Massimo Zucchetti

Mario Merola (top) (degree, nuclear engineering, Politecnico di Milano, Italy, 1988) is working on his PhD thesis on the plasma-facing components of fusion reactors. Since 1988, he has worked on the European program on fusion technology at the Joint Research Centre at Ispra, where he is currently a grantholder. His main work areas include thermal fatigue of the first wall from both numerical and experimental standpoints, nuclear standard codes, and materials science. In 1991, he started a conceptual study of a new high thermal performance divertor plate. **Massimo Zucchetti** (degree, nuclear engineering, 1986, and PhD, energetics, 1990, Politecnico di Torino, Italy) is a researcher at Politecnico di Torino, where he works in the field of fusion reactor neutronics (breeding blankets), neutron-induced radioactivity in fusion reactor materials, and the environmental impact of fusion machines, in collaboration with the Joint Research Centre at Ispra.

EXPERIMENTAL DEVICES

PROPOSAL FOR A NEUTRON SPECTROMETRY SYSTEM FOR THE INTERNATIONAL THERMONUCLEAR EXPERIMENTAL REACTOR

Janusz Wolski
Jerzy Wyzgal

Janusz Wolski (MSEng, nuclear physics, 1970, and PhD, technical physics, 1987, Military Academy of Technology, Poland) is a member of the research staff of the Institute of Plasma Physics and Laser Microfusion in Warsaw, Poland. He has been involved in the experimental and theoretical aspects of measurements of the parameters of neutrons emitted in plasma fusion experiments with laser-target, plasma focus, and tokamak devices. He also participated in the construction of a neutron spectrometer for the T-15 tokamak. **Jerzy Wyzgal** (chemistry and technical physics, Military Academy of Technology, Poland, 1983; mathematics, Warsaw University, Poland, 1987) has been with the Institute of Plasma Physics and Laser Microfusion since 1984. He has been involved in the numerical and theoretical aspects of

fusion neutron diagnostics, especially neutron measurements in plasma focus and tokamak devices. He has participated in the construction of a neutron spectrometer for the T-15 tokamak and in the investigation and construction of neutron diagnostics for the International Thermonuclear Experimental Reactor (ITER).

DESIGN SCALINGS AND OPTIMIZATION FOR THE SUPERCONDUCTING LARGE HELICAL DEVICE

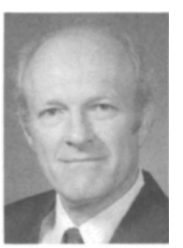
Kozo Yamazaki
Osamu Motojima
Makoto Asao

Kozo Yamazaki (top) (PhD, engineering, University of Tokyo, Japan, 1974) is an associate professor at the National Institute for Fusion Science (NIFS). He has worked on experiments and physics design studies for tokamak and helical systems. **Osamu Motojima** (center) (PhD, engineering, Kyoto University, Japan, 1976) is a director of research operations and device engineering at NIFS. He previously worked on the Heliotron-E experimental study. **Makoto Asao** (bottom) (BS, engineering, Kyoto University, Japan, 1986) is an engineer of Kobe Steel Ltd. He was a visiting researcher at the NIFS from 1989 to 1991, and he worked on design studies for the Large Helical Device.

COLD FUSION

EXAMINATION OF A PROPOSED PHONON-COUPLING MECHANISM FOR COLD FUSION

Oakley H. Crawford



Oakley H. Crawford (PhD, physical chemistry, University of Illinois, 1966) is a senior research scientist at the Oak Ridge National Laboratory, where he has worked since 1976. His current interests are in accelerator-based atomic physics and radiation physics, with emphasis on particle/solid interactions.

EXCESS HEAT DURING THE ELECTROLYSIS OF A LIGHT WATER SOLUTION OF K_2CO_3 WITH A NICKEL CATHODE

V. C. Noninski

V. C. Noninski (PhD, electrochemistry, Bulgarian Academy of Sciences, Bulgaria) is head of the Laboratory for Electrochemistry of Renewed Electrode-Solution Interface (LEPGER).

ELECTROCHEMICAL METHOD OF REDUCING ALUMINUM OXIDE AND PRODUCING ADDITIONAL ENERGY

Arthur Wasserman

Arthur Wasserman (BS, New York University) is an electrochemical engineering consultant.

SEARCH FOR ^3H, ^3He, AND ^4He IN D_2-LOADED TITANIUM

W. Brian Clarke
Roland M. Clarke

W. Brian Clarke (top) (BA, physics, Trinity College, Dublin, Ireland, 1958; PhD, physics, McMaster University, Canada, 1962) is currently a professor of physics of McMaster University, where he has taught and conducted research since 1965. His work has involved applications of noble gas mass spectrometry to the fields of cosmochemistry, oceanography, hydrology, and more recently to the development of methods for analysis of ultratrace lithium and boron in biological and geological materials. **Roland M. Clarke** is currently a fourth-year undergraduate student in mathematics and physics at the University of Toronto. He has conducted research since 1987 at McMaster University. His work has involved helium isotope mass spectrometry applied to analysis of lithium and boron in biological systems.

THE FUSION RATE IN THE TRANSMISSION RESONANCE MODEL

Magnus Jändel

Magnus Jändel (PhD, theoretical physics, Royal Institute of Technology, Sweden, 1985) was a fellow at the European Organization for Nuclear Research from 1986 to 1988. He was then at the Manne Seigbahn Institute of Physics and is now with the Royal Institute of Technology. His major activity is theoretical research in muon-catalyzed fusion. His interests include high-energy physics and astrophysics.

INTERFERENCE PHENOMENA OBSERVED DURING COLD FUSION

Takaaki Matsumoto

Takaaki Matsumoto (MS, nuclear engineering, Kyoto University, Japan, 1966) studied neutron and nuclear reactor physics at the Kyoto University Research Reactor Institute from 1966 to 1973. Since 1973 he has been with Hokkaido University as an associate professor of nuclear engineering. His interests include nuclear transmutation of radioactivity wastes and nuclear industry.