Fusion technology

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EXPERIMENTAL DEVICES

DEVELOPMENT OF A TWO-STAGE PELLET INJECTOR FOR HELIOTRON-E

Shigeru Sudo
Tomosumi Baba
Masahiro Kanno
Shigeki Saka

Shigeru Sudo (top right) (DSc, plasma physics, Tokyo University, Japan, 1977) worked on laser-irradiated pellet plasma production at Max-Planck-Institut für Plasmaphysik and has been a Kyoto University Plasma Physics Laboratory (KUPPL) research staff member since 1980. He is in charge of a Thomson scattering diagnostic system, pellet injection experiments, and development of pellet injectors for Heliotron-E. **Tomosumi Baba** (top left) (Dipl. Eng., mechanical engineering, Takamatsu Technical College, Japan, 1980) is a KUPPL staff member. His current interests are in the areas of pellet injector development and cryogenic, high-vacuum, and high-pressure technologies. **Masahiro Kanno** (bottom right) (BS, mechanical engineering, Waseda University, Japan, 1965) has worked as a mechanical engineer at Kobe Steel, Ltd. (KSL) since 1965. From 1985 to the present, he has been involved primarily in hypervelocity accelerators such as hydrogen pellet injectors and electromagnetic railguns. **Shigeki Saka** (bottom left) (BS, mechanical engineering, Yokohama National University, Japan, 1986) works at KSL, where he has been involved primarily in development of hydrogen pellet injectors, aiming at the high-speed hydrogen pellet. His interests are computer science and new mechanical technology.

CHARACTERIZATION OF A LASER ABLATION IMPURITY INJECTOR FOR THE TOKAMAK DE VARENNES

Dennis G. Whyte
Emile Haddad
Brian C. Gregory
Gilles Abel

Dennis G. Whyte (top) [BSc, engineering physics, University of Saskatchewan, Canada, 1986; MSc, Institut National de la Recherche Scientifique-Energie (INRS-Energie), Canada, 1988] is a PhD candidate, investigating the confinement of laser-ablated impurities. Previous work includes visible and ultraviolet spectroscopic studies of tokamak impurities. **Emile Haddad** (center) (BSc, Lebanese University, Lebanon, 1979; PhD, Ecole Polytechnique de Montreal, Canada, 1986) is a research physicist at MPB Technologies. Since 1986 he has worked on tokamak impurity production, transport, and confinement on the Tokamak de Varennes (TdeV). **Brian C. Gregory** (bottom) (BASc, University of Toronto, Canada, 1960; PhD, University of Cambridge, 1963) is director of research at the Canadian Center for Magnetic Fusion and professor at INRS-Energie. He has worked in the fields of electron beam design for microwave tubes, microwave interaction with plasmas, beam/plasma instabilities, atomic physics, electrical discharge physics, electrostatic stoppering of spindle

cusp plasma confinement devices, vacuum ultraviolet spectroscopy of tokamak impurities, and tokamak magnetohydrodynamic equilibria. He is currently interested in tokamak impurity transport and control. Previously, he worked for Thomson-CSF, France, and Trent University, Canada. **Gilles Abel** (right) (BSc, physics, Université de Montreal, Canada, 1972) has been a research officer at INRS-Energie since 1978 and joined the TdeV team in 1982. He has conducted experimental work in the field of ^{233}U fuel breeding with deuterium-tritium neutrons (an Atomic Energy of Canada, Ltd. project). As a TdeV team member, he has built a hard X-ray detection system and has contributed to the ultraviolet spectrometry system. Current interests are visible spectroscopy and bremsstrahlung (Z_{eff}) measurements.

PLASMA ENGINEERING

CURRENT DRIVE BY TOKAMAK INJECTION

Ricardo Farengo
Thomas R. Jarboe

Ricardo Farengo (top) (PhD, physics, University of Buenos Aires, Argentina, 1984) is a research assistant professor at the University of Washington. He was head of the Plasma Physics Section at the Atomic Energy Commission of Argentina, where he worked on microinstabilities in field-reversed configurations. At the University of Washington, he is responsible for most of the analytical work done in connection with the Coaxial Slow Source and for the interpretation of the experimental results. Lately he has become interested in current drive via helicity injection. **Thomas R. Jarboe** (BS, engineering physics, University of Illinois–Urbana; PhD, plasma physics, University of California–Berkeley) worked on a high-voltage theta pinch, a fast liner experiment, and the CTX spheromak experiment at the Los Alamos National Laboratory where he was a group leader. He is currently a professor of nuclear engineering at the University of Washington, pursuing the Helicity Injected Tokamak experiment. He has been involved in spheromak research, including equilibrium, stability, and sustainment physics, and has contributed to the understanding of the role of magnetic helicity during spheromak formation and sustainment.

INSTRUMENTATION AND DATA HANDLING

THE IDENTIFICATION OF HOT ELECTRON RINGS IN SPINDLE CUSP USING A MAGNETIC DIPOLE ANALYZER

Edbertho Leal-Quiros
Mark A. Prelas

Edbertho Leal-Quiros (top) (PhD, nuclear engineering, University of Missouri–Columbia, 1989; MS, physics, University of California–Los Angeles, 1986; BS, 1973, and MSc, 1977, physics, National University of Colombia, Colombia) is an instructor on the technical staff at Virginia Power's North Anna Nuclear Power Station. He has done research in atomic collisions, plasma, fusion, nonlinear dynamics, cryogenics, research physics, and thermohydrolysis. His main contributions have been in ion sources, energy analyzers, and plasma production, heating, and diagnostics. **Mark A. Prelas** (PhD, nuclear engineering, University of

Illinois, 1979) is an associate professor of nuclear engineering at the University of Missouri–Columbia. His research interests are in the areas of direct energy conversion, gaseous electronics, and plasma engineering

TRITIUM SYSTEMS

EXPERIMENTAL STUDY FOR SEPARATION CHARACTERISTICS OF CRYOGENIC DISTILLATION COLUMNS WITH AN H-D-T SYSTEM

Toshihiko Yamanishi
Mikio Enoeda
Kenji Okuno
Takumi Hayashi
Junzo Amano
Yuji Naruse
Robert H. Sherman

Toshihiko Yamanishi (top right) (MS, chemical engineering, Kyoto University, Japan) has been engaged in studies on hydrogen isotope separation by cryogenic distillation and by thermal diffusion. **Mikio Enoeda** (top left) (PhD, Kyushu University, Japan, 1987) worked on isotope separation from 1987 to 1990. He now works on blanket technology. **Kenji Okuno** (second from top right) (MS, 1975, and DSc, 1978, radiochemistry, Tohoku University, Japan) is a principal scientist at the Japan Atomic Energy Research Institute (JAERI). He is responsible for research and development of tritium technology at the Tritium Process Laboratory. His current interests are tritium/materials interactions and tritium chemistry. **Takumi Hayashi** (center left) (MS, chemistry, Kanazawa University, Japan, 1984; PhD, physics, Nagoya University, Japan, 1988) is currently a guest scientist at Los Alamos National Laboratory (LANL) under the U.S.-Japan Agreement on Fusion Energy. His current interests include tritium properties, tritium/materials interactions, and fusion fuel processing. **Junzo Amano** (third from top left) (mechanical engineering, Murano Kogyo High School, Japan, 1972) is a technician at the JAERI Tritium Process Laboratory. He works mainly on isotope separation and fuel cleanup systems. **Yuji Naruse** (bottom right) (BS, chemical engineering, Kyoto University, Japan, 1959) is head of the JAERI Tritium Engineering Laboratory. He has been engaged in engineering works related to uranium enrichment by the porous membrane method. **Robert H. Sherman** (bottom left) (BS, chemistry, Illinois Institute of Technology, 1951; PhD, chemistry, University of California–Berkeley, 1955) is a physical chemist in the Tritium Science and Technology Group at LANL. He has principal responsibility for the isotope separation and gas analysis sections. He has been developing Raman spectroscopy for application as a real-time analytical system. He is also collaborating in studies of muon-catalyzed deuterium-tritium fusion.

BLANKET ENGINEERING

CORE FLOW ANALYSIS OF LIQUID-METAL MAGNETOHYDRODYNAMIC FLOW IN SLOTTED CHANNELS WITH ANCHOR LINKS

Kathryn A. McCarthy

Kathryn A. McCarthy [BS, nuclear engineering, University of Arizona, 1983; MS, 1986, and PhD, 1989, nuclear engineering, University of California–Los Angeles (UCLA)] works for EG&G Idaho at the Idaho National Engineering Laboratory in the Fusion Safety Program. Formerly, she was a member of the UCLA

research staff and spent 9 months in the USSR as part of the Department of Energy U.S./USSR Young Scientist Program through UCLA. She also worked at the Kernforschungszentrum Karlsruhe, Federal Republic of Germany, as a guest scientist. Her research includes analysis of liquid-metal magnetohydrodynamic flow and fusion safety issues.

COLD FUSION

REVIEW OF EXPERIMENTAL OBSERVATIONS ABOUT THE COLD FUSION EFFECT

Edmund Storms

Edmund Storms (PhD, radiochemistry, Washington University) has worked at Los Alamos National Laboratory for the past 32 years. His work has mainly involved high-temperature materials research for space power. His studies have included a wide range of chemical and physical properties, including superconductivity, with a major emphasis on thermodynamics and materials science.

THE REALITY OF "COLD FUSION"

L. C. Case

L. C. Case (ScD, chemical engineering, Massachusetts Institute of Technology) worked at du Pont Research Station. He taught chemical engineering (applied and polymers) at Purdue and Tufts Universities. Currently, he owns and operates Eltron, Inc. His research interests include high-T_c superconductivity and cold fusion.

ON THE POSSIBILITY OF COHERENT DEUTERON-DEUTERON FUSION IN A CRYSTALLINE Pd-D LATTICE

S. N. Vaidya

S. N. Vaidya (MSc, physics, 1960, and PhD, 1966, Indian Institute of Technology, India) has been a scientific officer at Bhabha Atomic Research Centre since 1972. His interests include cold fusion, high-pressure research, and the theory of melting.