CONTENTS

VOLUME I

Opening Addresses

R.S. Pease Director of Culham Laboratory	1
Message from Guido Brunner Commissioner for Energy, Research, Science and Education	3
R. Hancox Symposium Chairman	5
Invited Lectures	
Fusion and Renewable Energy Resources. G.R. Bishop	7
Joint Research Centre, Ispra, Italy.	
Euratom Fusion Technology Programme. J. Darvas	19
Commission of the European Communities, Brussels.	
JET for Active Operation. P.H. Rebut	31
JET Joint Undertaking, Abingdon, U.K.	
Large Superconducting Magnets. W. Heinz KFK, Karlsruhe, Fed. Rep. of Germany.	59
The Zephyr Experiment.	77
W. Koppendorfer Max-Planck-Institut, Garching, Fed. Rep. of Germany.	
Technology of Heavy Ion Fusion.	89
J.D. Lawson Rutherford Laboratory, Chilton, U.K.	
Materials Problems in Fusion Reactors.	9 9
P. Schiller Joint Research Centre, Ispra, Italy	
Hybrid Reactors. R.W. Moir	111
Lawrence Livermore Laboratory, California, U.S.A.	
Design of an Engineering Test Facility. P.H. Sager	123
Oak Ridge National Laboratory, Tennessee, U.S.A.	
INTOR, a European View. G. Grieger	141
Max-Planck-Institut, Garching, Fed. Rep. of Germany.	

Contributed Papers	155
Lithium technology development for fusion reactors. Michael G. Down et al Westinghouse R & D Center, Pittsburgh, U.S.A.	157
Comparison of calculated and experimental neutron attenuation and streaming data for fusion reactor design. R.T. Santoro et al. Oak Ridge National Laboratory, Tennessee, U.S.A.	163
Thermoelectric MHD in fusion technology. J.A. Shercliff Warwick University, Coventry U.K.	171
Activation and decay heat of an aluminium blanket for experimental fusion reactors. P. Rocco et al. Joint Research Centre, Ispra, Italy.	177
Calculation of neutron and gamma-ray streaming through the neutral beam injector port of INTOR-J. M. Yamauchi et al. Nippon Atomic Industry Group, Kawasaki, Japan.	183
Transient analysis for fusion blanket power accidents. H.Th. Klippel ECN, Petten, The Netherlands.	189
Parameter study on poloidal response distributions in toroidal blanket geometries. K.A. Verschuur ECN, Petten, The Netherlands.	197
A conceptual composite blanket design for the tokamak type of thermonuclear reactor incorporating thermoelectric pumping of liquid lithium. P.B. Dutta Gupta Industrial Institute of Technology, Kharagpur, India.	205
Compatibility of Li ₂ O with impure helium. H. Migge Hahn-Meitner-Institut, Berlin, Fed. Rep. of Germany.	211
Fusion blankets for high-efficiency power cycles. J.L. Usher et al. Brookhaven National Laboratory, New York, U.S.A.	217
Design studies of an aluminium first wall for INTOR. J.R. Powell et al. Brookhaven National Laboratory, New York, U.S.A.	225
NOEL - a no-leak fusion blanket concept. J.R. Powell et al. Brookhaven National Laboratory, New York, U.S.A.	233
Surface heat loads during major disruptions in INTOR. P. Mioduszewski KFA, Julich, Fed. Rep. of Germany.	241
Prompt radiation, activation, and shielding in the ignition experiment ZEPHYR. H. Krause et al. Max-Planck-Institut, Garching, Fed. Rep. of Germany.	247
First wall life prediction by the FWLTB computer program. W. Daenner and J. Raeder Max-Planck-Institut, Garching, Fed. Rep. of Germany.	255

No success of tritium production in a lithium	2/7
Measurements of tritium production in a lithium- aluminate blanket model and comparison with theoretical studies.	263
P. Cloth et al. KFA, Julich, Fed. Rep. of Germany.	
Main features of an aluminium first wall and non-breeding blanket for experimental fusion reactors. G. Casini et al. Joint Research Centre, Ispra, Italy.	269
Slowing-down as a neutron multiplication substitute for fusion reactor blankets.	277
S. Taczanowski Institute of Physics and Nuclear Techniques, Cracow, Poland	
Neutronic design study of WITAMIR-I. C.W. Maynard and R.T. Perry University of Wisconsin, Madison, U.S.A.	283
Revised estimates of the tritium breeding performance of CTR blankets. L.J. Baker	289
AERE, Harwell, U.K.	
Shielding studies for the Culham Conceptual Tokamak Reactor Mk.II. C.A. Morrison	295
Imperial College of Science & Technology, London, U.K.	
Vacuum Systems	301
Dynamic response analysis of the vacuum vessel of JT-60 against saddle-like electromagnetic forces. H. Takatsu et al. JAERI, Tokai-mura, Japan.	303
A tokamak model test against seismic vibration. T. Ishizuka et al. Hitachi Works, Hitachi Ltd., Japan.	311
An eddy current test on a tokamak vacuum vessel model. T. Takizawa et al. Hitachi Works, Hitachi Ltd., Japan.	317
The thermo-magnetic transient in the vacuum vessel of a high field compact experiment.	323
G. Rubinacci University of Calabria, Italy.	
Electromagnetic loads on the ZEPHYR vacuum vessel caused by hard plasma disruption. K.F. Mast	329
Max-Planck-Institut, Garching, Fed. Rep. of Germany.	
New technologies applied to the vacuum vessel of ZEPHYR. H. Kotzlowski Max-Planck-Institut, Garching, Fed. Rep. of Germany.	337
Vacuum pumping system of the JET-Torus.	343
E. Usselmann JET Joint Undertaking, Abingdon, U.K.	5.5
Cryo-supply and transfer system for the JET neutral injection cryo-pumps.	349
W. Obert JET Joint Undertaking, Abingdon, U.K.	

2

The gas beaming effect in the JET neutral injection vacuum system.	357
A. Boschi JET Joint Undertaking, Abingdon, U.K.	
Hydrogen cryopump operated near 2.2K for the PETULA tokamak. G. Claudet et al. CEN, Grenoble, France.	363
Shield vacuum seal development. L.A. Mason AERE, Harwell, U.K.	369
Response of Zr-Al getter material to the anticipated TFTR in-torus environment. B. Ferrario et al. SAES Getters SpA, Milan, Italy.	375
Magnet Technology	385
A toroidal bitter plate magnet for an ignition test reactor. H. Becker and J.E.C. Williams Massachusetts Insitute of Technology, Cambridge, U.S.A.	387
Numerical computation of electromagnetic forces on the poloidal field coils of a tokamak device. G. Cennacchi et al. CNEN, Bologna, Italy.	397
Stress analysis in the toroidal field magnet of tokamak devices. G. Cenacchi and A. Taroni CNEN, Bologna, Italy.	403
A reliability test on a toroidal field coil by imposing force and heat simulating the actual load. M. Ohkubo et al. JAERI, Tokai-mura, Japan.	409
Design of rectangular coils for a tokamak. F. Hofmann et al. CRPP, Lausanne, Switzerland.	415
Stray field prevention in SPICA II. J.A. Hoekzema FOM-Instituut, Nieuwegein, The Netherlands.	421
Stray field asymmetry due to the choice of the iron core geometry in tokamaks. P. Hellingman FOM-Instituut, Nieuwegein, The Netherlands.	427
Stresses in the ignitor device: problems and solutions. G. Bernasconi et al. Politecnico, Milan, Italy.	433
Some considerations on the stress analysis of the Swiss coil for the large coil task. J.F. Jaeger et al. Institute for Reactor Research, Wurenlingen, Switzerland.	441
Test program on the insulation system for the JET inner poloidal coils. J.C. Rauch et al. Brown Boveri, Zurich, Switzerland.	449

VIII

3D-finite element model computation of the ASDEX divertor coils. O. Jandl and M. Pillsticker Max-Planck-Institut, Garching, Fed. Rep. of Germany.	455
Operational test and final technical concept of the ASDEX multipole magnetic field coils. M. Pillsticker et al. Max-Planck-Institut, Garching, Fed. Rep. of Germany.	461
Tape wound toroidal field magnet concept for ZEPHYR. U. Brossmann et al. Max-Planck-Institut, Garching, Fed. Rep. of Germany.	467
A bitter type toroidal field magnet for ZEPHYR. U.B. Brossmann Max-Planck-Institut, Garching, Fed. Rep. of Germany.	473
Development of a copper-austenite conductor for the Zephyr toroidal field coil. W.D. Haubenberger Max-Planck-Institut, Garching, Fed. Rep. of Germany.	479
Nb ₃ Sn strip superconductor in tokamak windings. C.R. Walters Rutherford Laboratory, Chilton, U.K.	483
Manufacture and mechanical test of a "Tores Supra" model coil. R. Aymar et al. CEN, Fontenay-aux-Roses, France.	489
Development of large D-shaped superconducting magnet. A. Miura et al. Toshiba Corporation, Yokohama, Japan.	495
The manufacture of the JET toroidal field coils. R. Pohlchen et al. JET Joint Undertaking, Abingon, U.K.	499
Mechanical design of the poloidal coils for a large RFP experiment. B.A. Schrefler et al. University of Padua, Italy.	505
Poloidal magnetic system for a large RFP experiment. M. Guarnieri and A. Stella University of Padua, Italy.	511
Analysis of some fault conditions for the poloidal system of RFX. F. Gnesotto University of Padua, Italy.	519
The design and development of the coils and cooling system for the DITE Mk II bundle divertor. H.J. Crawley et al. Culham Laboratory, Abingdon, U.K.	527
Finite element analysis of the mechanical behaviour of the LCT-coil under magnetic body forces. G. Messemer and H. Zehlein KFK, Karlsruhe, Fed. Rep. of Germany.	533
The mechanical design of the Euratom test coil for the large coil task. H. Krauth et al. KFK, Karlsruhe, Fed. Rep. of Germany.	539

Tritium	545
TRIPERM - a versatile experimental facility for studying tritium and hydrogen permeation at nuclear heat exchanger conditions. H.P. Buchkremer et al. KFA, Julich, Fed. Rep. of Germany.	547
Diffusion of tritium in ceramic blanket materials: the temperature dependence of the diffusion of tritium in β -Li ₅ AlO ₄ . D. Guggi et al. KFA, Julich, Fed. Rep. of Germany.	553
The influence of oxide film growth on tritium permeation through ^{steam} generator tubing. N. Forsyth and W. Thiele Hochtemperatur-Reaktorbau GmbH, Mannheim, Fed. Rep. of Germany.	559
Helium purification by a tritiated water absorption system. F. Van Rutten Joint Research Centre, Ispra, Italy.	565
Evaluation of large-scale gaschromatography for the recovery and separation of tritium from the exhaust of tritium-burning tokamak fusion experiments. J. Perchermeier and H. Weichselgartner Max-Planck-Institut, Garching, Fed. Rep. of Germany.	571
Experimental Systems	579
Mechanical technology unique to laser fusion experimental systems. C.A. Hurley Lawrence Livermore Laboratory, California, U.S.A.	581
Technology for large tandem mirror experiments. Keith I. Thomassen Lawrence Livermore Laboratory, California, U.S.A.	587
Design of the ERASMUS 2 tokamak. V.P. Bhatnagar et al. Ecole Royale Militaire, Brussels, Belgium.	593
Design and construction of the TCA tokamak. A.D. Cheetham et al. CRPP, Lausanne, Switzerland.	601
The reconfiguration of Doublet III to facilitate a reactor simulation experiment. John M. Rawls General Atomic Company, San Diego, U.S.A.	609
Pulsed power supply and coil assembly of TPE-2. Y. Sato et al. Hitachi Ltd., Tokai-mura, Japan.	615
The design of SPICA II. SPICA II team. FOM-Instituut, Nieuwegein, The Netherlands.	621
A neutral beam-line installation for testing injector systems in the long pulse, megawatt regime. Neutral Injection Development Group Culham Laboratory, Abingdon, U.K.	629
Completion and start-up phase of the ASDEX tokamak. F. Wesner et al. Max-Planck-Institut, Garching, Fed. Rep. of Germany.	635

An equipment protection and safety system for ASDEX tokamak. J. Gernhardt et al. Max-Planck-Institut, Garching, Fed. Rep. of Germany.	641
The JET mechanical structure - final design. L. Sonnerup et al. JET Joint Undertaking, Abingdon, U.K.	649
Design proposal for the 2.0 MA RFX load assembly. A. Bond et al. Culham Laboratory, Abingdon, U.K.	657
The manufacture and assembly of a conducting shell and vacuum liner for the HBTXIA experiment. S. Butterworth et al. Culham Laboratory, Abingdon, U.K.	663
DITE status and upgrade proposals. D.V. Bayes et al. Culham Laboratory, Abingdon, U.K.	669
Reduction of vibrational interference from the iron core on HBTXIA. P.D. Wilcock Culham Laboratory, Abingdon, U.K.	675