

**JOURNAL OF  
PLASMA PHYSICS**

JOURNAL OF PLASMA PHYSICS exists for the publication of experimental and theoretical research papers on plasma physics and its applications.

EDITOR

DR J. P. DOUGHERTY

*Department of Applied Mathematics and Theoretical Physics, University of Cambridge,  
Silver Street, Cambridge CB3 9EW, England*

ASSOCIATE EDITORS

PROF. D. BERSHADER

*Department of Aeronautics and Astronautics,  
Stanford University, Stanford, California 94305, USA*

DR E. INFELD

*Institute of Nuclear Research, Hoza 69, PL-00-681, Warsaw, Poland*

PROF. P. K. KAW

*Institute for Plasma Research, Bhat, Gandhinagar 382 424, India*

Authors wishing to have papers published in the JOURNAL should communicate them to any one of the persons named above, choosing one in their own country where possible.

Authors are urged to ensure that their papers are written clearly and attractively, in order that their work will be readily accessible to readers.

Manuscripts should be typed in double spacing on one side of the paper only, with references listed at the end in alphabetical order of authors. Drawings should be done in Indian ink on plain white or transparent paper, and should not be larger than 15 in. by 24 in. Lettering should be shown clearly in pencil for reproduction by the printer, and as far as possible information relating to a figure should be placed in the caption rather than on the figure. A typed list of captions should be provided at the end of the manuscript. Proofs of papers from overseas will usually be despatched to authors by airmail. There is no charge for publication. Authors are entitled to receive 50 offprints of a paper in the JOURNAL free of charge, and additional offprints can be purchased if ordered in advance.

© Cambridge University Press 1991

#### *Copying*

This journal is registered with the Copyright Clearance Center, 27 Congress St., Salem, Mass. 01970. Organizations in the USA who are also registered with C.C.C. may therefore copy material (beyond the limits permitted by sections 107 and 108 of US copyright law) subject to payment to C.C.C. of the per copy fee of \$05.00. This consent does not extend to multiple copying for promotional or commercial purposes. Code 0022-3778/91 \$5.00 + .00.

*ISI Tear Sheet Service*, 3501 Market Street, Philadelphia, Pennsylvania 19104, USA, is authorized to supply single copies of separate articles for private use only.

*For all other use*, permission should be sought from Cambridge or the American Branch of Cambridge University Press.

JOURNAL OF PLASMA PHYSICS (ISSN 0022-3778) is published once every two months in February, April, June, August, October and December, by Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU and Journals Department, 40 West 20th Street, New York, NY 10011-4211.

Three parts form a volume. The subscription price (which includes postage) of Volumes 45 and 46 (1991) is £115.00 net UK, £117.00 elsewhere per volume (US \$239.00 in the USA and Canada) for institutions; £57.50 (US \$175.00) per volume for individuals. Single parts cost £39.00 each (US \$79.00 in the USA and Canada) plus postage. All orders must be accompanied by payment.

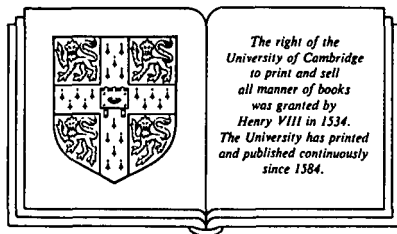
Copies of the journal for subscribers in the United States of America and Canada are sent by air to New York to arrive with minimum delay.

Second class postage paid at New York, NY, and at additional mailing offices. *POSTMASTER*: send address changes in USA, and Canada to *Journal of Plasma Physics*, Cambridge University Press, 110 Midland Avenue, Port Chester, New York, NY 10573-9864.

# JOURNAL OF PLASMA PHYSICS

VOLUME 45

1991



CAMBRIDGE UNIVERSITY PRESS

*Cambridge*

*New York Port Chester Melbourne Sydney*

Published by the Press Syndicate of the University of Cambridge  
The Pitt Building, Trumpington Street, Cambridge CB2 1RP  
40 West 20th Street, New York, NY 10011-4211  
10 Stamford Road, Oakleigh, Victoria 3166, Australia

© Cambridge University Press 1991

*Printed in Great Britain by the University Press, Cambridge*

# CONTENTS TO VOLUME 45

## PART 1 FEBRUARY 1991

Editorial notice. J. P. DOUGHERTY	1
Analytical study of plasma heating by resonant absorption of the modified external kink mode. D. VAN EESTER, M. GOOSSENS and S. POEDTS	3
Adiabatic theory of nonlinear electron-cyclotron resonance heating. I. A. KOTEL'NIKOV and G. V. STUPAKOV	19
Linear resonant interaction of an electromagnetic wave with a collisional inhomogeneous plasma. J. LACINA	29
Effect of weak ambipolar field on non-local heat transport using the non-diffusive approximation. G. MURTAZA, ARSHAD M. MIRZA and M. S. QAISAR	51
Asymptotic solution of the Vlasov and Poisson equations for an inhomogeneous plasma. RICCARDO CROCI	59
Magnetic-energy release from a zero-net-current layer. J. S. KIM, G. VAN HOVEN, D. D. SCHNACK and J. F. DRAKE	71
Self-interaction of Alfvén waves in a cylindrical waveguide filled with an ideally conducting compressible plasma. NAGENDRA KUMAR and KRISHNA M. SRIVASTAVA	89
Velocity-space diffusion due to resonant wave-wave scattering of electromagnetic and electrostatic waves in a plasma. REIJI SUGAYA	103
Parametric decay of a whistler wave at the difference frequency of two electromagnetic waves in a plasma. S. GUHA and RUBY SARKAR	115
Waves in a paramagnetic plasma. W. BANTIKASSEGN and V. N. MAL'NEV	125
BOOK REVIEWS	
<i>The Physics of Laser Plasma Interactions</i> by W. L. Kruer	135
<i>Plasma Physics for Nuclear Fusion</i> by Kenro Miyamoto	135

## PART 2 APRIL 1991

Theoretical study of a plasma column sustained by an electromagnetic surface wave in the dipolar mode. E. BENOVA, I. GHANASHEV and I. ZHELYAZKOV	137
Generation and radiation of third harmonics by an electrostatic wave in a narrow inhomogeneous layer of a warm plasma. A. M. HUSSEIN	153

Reconstruction of global micropulsations in the magnetosphere. M. H. WANG, S. P. KUO and M. C. LEE	159
Propagation of electromagnetic waves in a density-modulated plasma. MAURIZIO LONTANO and NICOLAI LUNIN	173
Stability analysis of sheared non-neutral relativistic cylindrical electron beams in applied magnetic fields. D. ZOLER and S. CUPERMAN	191
Variational approach to Langmuir waves described by the Zakharov equations. J. C. BHAKTA	203
Kinetic theory of Alfvén waves in plasmas with force-free currents. I. J. DONNELLY and B. E. CLANCY	213
Excitation of thermonuclear cone instabilities by toroidal equilibrium distributions of high-energy alpha particles in tokamaks. M. LISAK, H. HAMNÉN and D. ANDERSON	229
Aspects of subgrid modelling and large-eddy simulation of magneto-hydrodynamic turbulence. YE ZHOU and GEORGE VAHALA	239
Computer modelling of three-dimensional dynamics of fast reconnection. M. UGAI	251
Tearing mode stability in a cylindrical plasma with equilibrium flows. K. P. WESSEN and M. PERSSON	267
Nonlinear acoustic waves in partially ionized collisional plasmas. N. N. RAO, D. J. KAUP and P. K. SHUKLA	285
PART 3 JUNE 1991	
Experiments on the nonlinear evolution of surface waves in an open plasma waveguide. D. GROZEV, A. SHIVAROVA and S. TANEV	297
Arbitrary-amplitude electron-acoustic solitons in a two-electron-component plasma. R. L. MACE, S. BABOOLAL, R. BHARUTHRAM and M. A. HELLBERG	323
Stochasticity caused by radiation misalignment in magnetized free-electron lasers with trapped particles. F. B. RIZZATO	339
Wave collapse in the lower part of the ionosphere. L. STENFLO	355
A new representation of relativistic wave damping above the electron-cyclotron frequency. G. GRANATA and I. FIDONE	361
Dissipative magnetohydrodynamic states with non-ideal boundary conditions. Y. Z. AGIM and D. MONTGOMERY	371
Finite-frequency surface waves on current sheets. K. P. WESSEN and N. F. CRAMER	389
Electron plasma oscillations at arbitrary Debye lengths. B. LEHNERT	407

Relativistic charge currents in oblique electric and magnetic fields. FULVIO MELIA and MARCO FATUZZO	415
Non-ideal stability: variational method for the determination of the outer-region matching data. A. PLETZER and R. L. DEWAR	427
Phase-mixing and surface waves: a new interpretation. P. S. CALLY	453
Helicity waves propagating in a plasma. Z. YOSHIDA	481
BOOK REVIEWS	
<i>From Particles to Plasmas: Lectures Honouring Marshall N. Rosenbluth</i>	489
<i>RF Plasma Heating in Toroidal Fusion Devices</i> , by V. E. Golant and V. I. Federov	489
AUTHOR INDEX TO VOLUME 45	491

**JOURNAL OF PLASMA PHYSICS**

Volume 45 Part 3 June 1991

**CONTENTS**

Experiments on the nonlinear evolution of surface waves in an open plasma waveguide D. GROZEV, A. SHIVAROVA AND S. TANEV	297
Arbitrary-amplitude electron-acoustic solitons in a two-electron-component plasma R. L. MACE, S. BABOOLAL, R. BHARUTHRAM AND M. A. HELLBERG	323
Stochasticity caused by radiation misalignment in magnetized free-electron lasers with trapped particles F. B. RIZZATO	339
Wave collapse in the lower part of the ionosphere L. STENFLO	355
A new representation of relativistic wave damping above the electron-cyclotron frequency G. GRANATA AND I. FIDONE	361
Dissipative magnetohydrodynamic states with non-ideal boundary conditions Y. Z. AGIM AND D. MONTGOMERY	371
Finite-frequency surface waves on current sheets K. P. WESSEN AND N. F. CRAMER	389
Electron plasma oscillations at arbitrary Debye lengths B. LEHNERT	407
Relativistic charge currents in oblique electric and magnetic fields FULVIO MELIA AND MARCO FATUZZO	415
Non-ideal stability: variational method for the determination of the outer-region matching data A. PLETZER AND R. L. DEWAR	427
Phase-mixing and surface waves: a new interpretation P. S. CALLY	453
Helicity waves propagating in a plasma Z. YOSHIDA	481
BOOK REVIEWS	
<i>From particles to plasmas: lectures honouring Marshall N. Rosenbluth</i>	489
<i>RF plasma heating in toroidal fusion devices</i> , by V. E. Golant and V. I. Fedorov	489
AUTHOR INDEX TO VOLUME 45	491

© Cambridge University Press 1991

**CAMBRIDGE UNIVERSITY PRESS**

THE PITT BUILDING, TRUMPINGTON STREET, CAMBRIDGE CB2 1RP

40 WEST 20TH STREET, NEW YORK, NY 10011-4211, USA

10 STAMFORD ROAD, OAKLEIGH, VICTORIA 3166, AUSTRALIA