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, U.S.A.

PROF. F. D. KAHN Department of Astronomy, University of Manchester, Manchester M13 9PL, England

PROF. W. B. THOMPSON

Department of Physics, University of California, La Jolla, California 92093, U.S.A.

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 1982

Copying

This journal is registered with the Copyright Clearance Center, 21 Congress St., Salem, Mass. 01970. Organizations in the U.S.A. who are also registered with C.C.C. may therefore copy material (beyond the limits permitted by sections 107 and 108 of U.S. copyright law) subject to payment to C.C.C of the per copy fee of \$02.50. This consent does not extend to multiple copying for promotional or commercial purposes. Code 0022-3778/82/2828-0001 \$02.50.

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

For all other use, permission should be sought from the Cambridge or New York offices of the 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 32 East 57th Street, New York, N.Y. 10022.

Three parts form a volume. The subscription price (which includes postage) of Volumes 27 and 28 (1982) is £62.50 net per volume (US \$177.00 in the U.S.A. and Canada) for institutions; £31.25 (US \$88.50) per volume for individuals. Single parts cost £23.50 each (US \$66.50 in the U.S.A. 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, N.Y., and at additional mailing offices. *POSTMASTER*: send address changes in U.S.A. and Canada to Cambridge University Press, 32 East 57th Street, New York, N.Y. 10022.

JOURNAL OF PLASMA PHYSICS

VOLUME 27 1982

CAMBRIDGE UNIVERSITY PRESS CAMBRIDGE LONDON NEWYORK NEWROCHELLE

MELBOURNE SYDNEY

Published by the Press Syndicate of the University of Cambridge The Pitt Building, Trumpington Street, Cambridge CB2 1RP 32 East 57th Street, New York, N.Y. 10022

© Cambridge University Press 1982

Printed in Great Britain at the University Press, Cambridge

CONTENTS TO VOLUME 27

PART 1 FEBRUARY 1982

Effect of collisional and viscous dissipations on the ion-acoustic- Langmuir interactions. M. MOHAN and B. BUTI	page 1
Stability of Vlasov equilibria. Part 1. General theory. K. R. SYMON, C. E. SEYLER and H. R. LEWIS	13
Stability of Vlasov equilibria. Part 2. One non-ignorable co-ordinate. H. R. LEWIS and C. E. SEYLER	25
Stability of Vlasov equilibria. Part 3. Models. C. E. SEYLER and H. R. LEWIS	37
Dynamics of charge density fluctuations in two-component hydrogen plasma. F. YOSHIDA	55
Wave excitation by inhomogeneous suprathermal electron beams. H. P. FREUND, D. DILLENBURG and C. S. WU	69
Turbulent 'polarization' terms and the Balescu-Lenard operator. J. A. KROMMES and M. T. KOTSCHENREUTHER	83
A theory for Langmuir solitons. N. N. RAO and R. K. VARMA	95
Propagation of hydromagnetic waves in a relativistic plasma. A. GRANIK	121
Rayleigh-Taylor instability of a plasma in a magnetic field: nonlinear theory. B. K. SHIVAMOGGI	129
A study of the mass ratio dependence of the mixed species collision integral for isotropic velocity distribution functions. A. J. M. GARRETT	135
Analysis of a generalized nonlinear diffusion equation in fusion plasma physics. D. ANDERSON and M. LISAK	149
Evolution of current sheets following the onset of enhanced resistivity. T. G. FORBES, E. R. PRIEST and A. W. HOOD	157
Further analysis of nonlinear, periodic, highly superluminous waves in a magnetized plasma. P. C. CLEMMOW	177
Comments on the paper 'Self-similar state of weakly turbulent plasma' by R. Balescu. G. E. VEKSTEIN, D. D. RYUTOV and R. Z. SAGDEEV	189
Reply to the comments by G. E. Vekstein, D. D. Ryutov and R. Z. Sagdeev. R. BALESCU	191

Contents

PART 2 APRIL 1982

Properties of Alfvén solitons in a finite-beta plasma. S. R. SPANGLER and J. P. SHEERIN page	193
Oblique whistler-mode propagation in a hot anisotropic plasma. S. S. SAZHIN and E. M. SAZHINA	199
Electromagnetic waves in a relative plasma stream: fusion instability. J. N. MOHANTY and P. MISRA	205
The ponderomotive force of a high-frequency electromagnetic field in a cold magnetized plasma. V. I. KARPMAN and A. G. SHAGALOV	215
Whistler wave propagation in density ducts. V. I. KARPMAN and R. N. KAUFMAN	225
Stability of strong electromagnetic waves in overdense plasmas. F. J. ROMEIRAS	239
Low-frequency nonlinear resonances and averaged potential in bounded parallel fields plasma. N. A. NIKOLOV and P. N. MALINOV	261
Periodic, highly superluminous, nonlinear waves in a cold, unmagnetized plasma. P. C. CLEMMOW	267
Spectroscopic measurements of the velocity distribution of neutral particles in a plasma in front of a wall. E. K. SOUW, J. HACKMANN and J. UHLENBUSCH	277
Parametric drive of vortex and magnetostatic modes in a strongly non- isothermal plasma. H. U. RAHMAN, P. K. SHUKLA and G. MURTAZA	295
Side-scattering of an ordinary electromagnetic wave by electron-acoustic oscillations. R. P. SHARMA and M. Y. YU	303
Stability and eigenfrequency bounds for steady flow of a cylindrical electrostatic plasma. R. J. LUCAS	309
Stationary surface waves in magnetohydrodynamics. B. K. SHIVAMOGGI	321
The plasma dispersion relation near the two-ion hybrid resonance. S. C. CHIU, V. S. CHAN, J. Y. HSU and D. G. SWANSON	327
Transverse intermediate waves in a relativistic plasma with a finite conductivity. A. GRANIK	343
Dispersion relations for ion waves with finite parallel wavelength in plasmas of finite beta. S. H. BRECHT.	351
Effects of ambient plasma and background temperature on the beam- plasma instability and beam-plasma discharge at low pressures in bounded systems. I. ROTH and S. CUPERMAN	363

PART 3 JUNE 1982

The relaxation zone behind normal shock waves in a reacting dusty gas Part 1. Monatomic gases. G. BEN-DOR and O. IGRA p	age 377
Parametric study of the relaxation zone behind strong normal shock waves in a dusty ionized monatomic gas. O. IGRA and G. BEN-DOR	s 397
The mean electromotive force generated by random Alfvén waves in a collisionless plasma. T. NAMIKAWA and H. HAMABATA	ւ 415
A steady-state model of current filamentation caused by the electro- thermal instability in a fully ionized magnetized plasma. M. G. HAINES and F. MARSH	
Grad-Fokker-Planck plasma equations. Part 1. Collision moments. K. A BROUGHAN	437
Nonlinear equilibrium and stability analysis of rippled, partially neutral ized, magnetically focused electron beams. S. CUPERMAN and F. PETRAN	
Kinetic theory for short-wavelength lasing plasma. D. M. HEFFERNAN and R. L. LIBOFF	r 473
Implosion of a uniform current sheet in a low-beta plasma. T. G. FORBES	s 491
Weakly nonlinear dispersive waves: group velocity. B. K. SHIVAMOGGI	507
Relativistic dielectric tensor of a Maxwellian plasma for electron cyclo tron waves at arbitrary propagation angles. A. C. AIROLDI and A OREFICE	
Ion turbulence and thermal transport in laser-produced plasmas. H. C BARR and T. J. M. BOYD	525
Second harmonic interference patterns of ion-acoustic waves. L. SCHOTT	r 543
Heating of electrons and ions by inverse bremsstrahlung absorption a self-similar state of the plasma. R. BALESCU	: 553
Author Index to Volume 27	571

JOURNAL OF PLASMA PHYSICS

Volume 27 Part 3 June 1982

CONTENTS

The relaxation zone behind normal shock waves in a reacting	
dusty gas. Part 1. Monatomic gases	0.7.7
	page 377
Parametric study of the relaxation zone behind strong normal shock waves in a dusty ionized monatomic gas	0.07
O. IGRA AND G. BEN-DOR	397
The mean electromotive force generated by random Alfvén waves in a collisionless plasma	
T. NAMIKAWA AND H. HAMABATA	415
A steady-state model of current filamentation caused by the electrothermal instability in a fully ionized magnetized plasma	
M. G. HAINES AND F. MARSH	427
Grad-Fokker-Planck plasma equations. Part 1. Collision momen K. A. BROUGHAN	its 437
Nonlinear equilibrium and stability analysis of rippled, partially neutralized, magnetically focused electron beams	
S. CUPERMAN AND F. PETRAN	453
Kinetic theory for a short-wavelength lasing plasma	
D. M. HEFFERNAN AND R. L. LIBOFF	473
Implosion of a uniform current sheet in a low-beta plasma T. G. FORBES	491
Weakly nonlinear dispersive waves: group velocity	
B. K. SHIVAMOGGI	507
Relativistic dielectric tensor of a Maxwellian plasma for electron cyclotron waves at arbitrary propagation angles	l.
A. C. AIROLDI AND A. OREFICE	515
Ion turbulence and thermal transport in laser-produced plasmas H. C. BARR AND T. J. M. BOYD	525
	020
Second harmonic interference patterns of ion-acoustic waves L. SCHOTT	543
Heating of electrons and ions by inverse bremsstrahlung absorption: a self-similar state of the plasma	
R. BALESCU	553
AUTHOR INDEX TO VOLUME 27	571

© Cambridge University Press 1982

CAMBRIDGE UNIVERSITY PRESS

THE PITT BUILDING, TRUMPINGTON STREET, CAMBRIDGE CB2 1RP 32 EAST 57TH STREET, NEW YORK, N.Y. 10022

Printed in Great Britain at the University Press, Cambridge