

PHYSICAL REVIEW LETTERS_{TM}

Providing rapid publication of short reports of important fundamental research, with coverage of major advances in all aspects of physics and of developments with significant consequences across subdisciplines.

Editors

JACK SANDWEISS
GEORGE BASBAS
ROBERT GARISTO
SAMINDRANATH MITRA
REINHARDT B. SCHUHMAN

Associate Editor

BRANT M. JOHNSON

Senior Assistant Editors

MANOLIS ANTONOYIANNAKIS
DONAVAN HALL
SAAD E. HEBBOUL
JEROME MALENFANT
YONKO MILLEV
JANE THROWE
DANIEL UCKO

Assistant Editors

ABHISHEK AGARWAL
SONJA GRONDALSKI
VALERIE L. MILLER
JOHN RIPKA

Consulting Editor

STANLEY G. BROWN

Adjunct Associate Editors

KARSTEN KRUSE
FRANK NARDUCCI
DENIZ VAN HEIJNSBERGEN

Editorial Board (Divisional Associate Editors)

JACK SANDWEISS, Chairman

Astrophysics

N. ANDERSSON, R. CALDWELL, R. COWSIK, E. POISSON, M. VISSER

Atomic, Molecular, and Optical Physics

S.M. BARNETT, M. CAPONE, C.L. COCKE, M. FLEISCHHAUER,
M. INGUSCIO, K. MOLMER, J.-M. RAIMOND

Biological Physics

F. MACKINTOSH

Chemical Physics

G. PACCHIONI

Condensed Matter Physics

Y. AVISHAI, M. BAYER, J. BEAMISH, J. BLOCH, R.A. BLYTHE,
C.H. BOOTH, D. BOYANOVSKY, N. BRILLIANTOV, P.W. BROUWER,
H. CHATÉ, S. COPPERSMITH, H.D. DREW, K. ENSLIN, H.A. FERTIG,
A. FUJIMORI, Y. GEFFEN, K. INGERSENT, D.C. JOHNSTON, P. JUNG,
A.B. KUKLOV, J. MACHTA, S. MAJUMDAR, R. MERLIN, H. MUNEKATA,
P. PRELOVSEK, N.V. PROKOFEV, J. RIERA, D. SEN, A.J. SIEVERS,
S.B. SINNOTT, A.K. SOPER, C.M. SOUKOULIS, N.A. SPALDIN, M. VOJTA,
F. VON OPPEN, S. WHITE

Fluid Dynamics

L. BIFERALE, P. TABELING

Laser Science

H.J. CARMICHAEL, T. ELSAESSER, B.A. MALOMED, P.W. MILONNI,
M.G. RAYMER

Materials Physics

A. BRATAAS, U. DIEBOLD, R. FEENSTRA, J. NEATON, M. PAYNE,
S.K. STREIFFER, H. ZABEL

Nuclear Physics

D.J. DEAN, J.C. HARDY, N. HERRMANN, V. KOCH, H. SAKAI, J. WAMBACH

Particles and Fields

P. DE FORCRAND, A. DONNACHIE, M. DREES, H.J. FRISCH, A.A. TSEYTLIN,
R.R. VOLKAS

Physics of Beams

I. BEN ZVI

Plasma Physics

T.C. LUCE, J.-P. MATTE, W. MATTHAEUS, P.A. NORREYS, H. WEITZNER

Polymer Physics

J. DE PABLO, J. DOUGLAS

Foundations of Quantum Mechanics

R. JOZSA

Quantum Information

J.-W. PAN, F. K. WILHELM

American Physical Society

Officers

President ROBERT L. BYER
President-Elect MICHAEL S. TURNER
Vice-President MALCOLM R. BEASLEY
Past President BARRY C. BARISH
Editor in Chief GENE D. SPROUSE
Treasurer and Publisher JOSEPH W. SERENE
Executive Officer KATE P. KIRBY

One Physics Ellipse
College Park, MD 20740-3844

APS Editorial Office

Directors

Editorial DANIEL T. KULP
Journal Information Systems MARK D. DOYLE
Journal Operations CHRISTINE M. GIACCONE

1 Research Road
Ridge, NY 11961-2701
Phone: (631) 591-4060 Fax: (631) 591-4141
Email: prl@aps.org
Web: <http://publish.aps.org/>
Submissions: prltex@aps.org or
<http://authors.aps.org/ESUB/>

Member Subscriptions:

APS Membership Department

One Physics Ellipse
College Park, MD 20740-3844
Phone: (301) 209-3280 Fax: (301) 209-0867
Email: membership@aps.org

Institutional Subscriptions:

APS Subscription Services

P.O. Box 41
Annapolis Junction, MD 20701
Toll free: (888) 339-9655
Phone: (301) 617-7809 Fax: (240) 757-4289
Email: subs@aps.org

Letters intended for this journal must be short and self-contained. A description of editorial Policies and Practices is published in the first January and July issues and can be found on our Web server. Instructions for manuscript preparation are given in the Information for Contributors published in the first issue of each volume and available on our Web server.

Manuscripts should be **submitted** electronically in acceptable format (see <http://authors.aps.org/ESUB/> or inquire at prltex@aps.org). If this is not possible, send one copy to the Editorial Office. Submission is a representation that the manuscript has not been published previously and is not currently under consideration for publication elsewhere. Authors should provide indexing codes according to the PACS scheme (available at <http://publish.aps.org/PACS/>). An executed APS **copyright-transfer** form (effective only on acceptance for publication) must be provided; the form is available via our Web submission server and via <http://authors.aps.org/>.

To help defray editorial and production expenses, authors of published Letters are expected to pay a **publication charge** of \$670 (\$235 for a Comment or Reply). Charges are higher (\$825 for a Letter, \$300 for a Comment or Reply) for those which are not submitted in an acceptable electronic format. Acceptable formats are REV_TEX (preferred), L_AT_EX, plain T_EX, MS Word; PostScript figures (preferred). **Reprints** are offered for sale to authors.

For information about **subscription prices** and about the **online version** of the journal, see our Web server, or inquire at assocpub@aps.org. **Member** inquiries regarding **subscriptions**, renewals, address changes, missing or damaged copies, and single-copy orders should be addressed to the APS Membership Department. **Institutional subscribers** should address subscription inquiries to APS Subscription Services. For address changes please send both old and new addresses, and if possible, send the mailing label from a recent issue.

Copyright © 2012 American Physical Society. All rights reserved.
Physical Review Letters_{TM} is a trademark of the American Physical Society.

Rights and Permissions: See <http://publish.aps.org/copyrightFAQ.html>.

Copying: No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the written permission of the publisher, except as stated below. Single copies of individual articles may be made for private use or research. Authorization is given to copy articles beyond the use permitted by Sections 107 and 108 of the U.S. Copyright Law, provided the copying fee of \$25.00 per copy per article is paid to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, USA.

Reproduction of an entire Article in a reprint collection, or for advertising or promotional purposes, or republication in any form requires permission from APS. Permission must be sought from the Associate Publisher, American Physical Society, One Physics Ellipse, College Park, MD 20740-3844; email: assocpub@aps.org.

Other Use: Permission is granted to quote from the journal with the customary acknowledgment of the source. Permission must be sought from the APS Associate Publisher to reproduce a figure, table, or excerpt of an Article. Authorization for private use or research does not extend to systematic or multiple reproduction, to copying for promotional purposes, to distribution in any format, or to republication in any form. In all such cases, specific permission from APS must be obtained.

Physical Review Letters_{TM} [ISSN: 0031-9007 (print), 1079-7114 (online); CODEN PRLTAO; printed in USA] is published weekly by the American Physical Society, 1 Research Road, Ridge, NY 11961-2701.

POSTMASTER: Send address changes to Physical Review Letters_{TM}, APS Subscription Services, P.O. Box 41, Annapolis Junction, MD 20701. The 2012 print + online base price is \$3250. Periodicals postage rates are paid at College Park, MD, and additional mailing offices.