

PHYSICAL REVIEW LETTERS

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 HUGUES CHATÉ ROBERT GARISTO SAMINDRANATH MITRA REINHARDT B. SCHUHMANN Associate Editors ABHISHEK AGARWAL ROCIO CORTES SERENA DALENA KEVIN DUSLING SONJA GRONDALSKI DONAVAN HALL SAAD E. HEBBOUL BRANT M. JOHNSON WANG MU STOJAN REBIC KATHERINE R. THOMAS JANE THROWE DANIEL UCKO Assistant Editors VALERIE L. MILLER JOHN RIPKA Consulting Editor GEORGE BASBAS Adjunct Associate Editors STEPHAN GRILL FRANK NARDUCCI DENIZ VAN HEIJNSBERGEN	Editorial Board (Divisional Associate Editors) <i>Astrophysics</i> J. BEACOM, A. KOSOWSKY, J. LATTIMER <i>Atomic, Molecular, and Optical Physics</i> M. DAVIS, R. DÖRNER, M.D. HAVEY, N. LUTKENHAUS, G. MORIGI, H. RITSCH, J. RUOSTEKOSKI, F. SCHMIDT-KALER, W. ZHANG <i>Biological Physics</i> H. LEVINE, J.W. SHAEVITZ, L. TSIMRING <i>Chemical Physics</i> K. MORGENSTERN, A. TKATCHENKO <i>Condensed Matter Physics</i> J.L. BARRAT, K. BEHNIA, F.J. BERMEJO, R. CLAESSEN, T. EGAMI, R. EGGER, D.L. FENG, M. FRANZ, F.J. GARCIA-VIDAL, H. GLYDE, M.B. HASTINGS, T. HEINZEL, M.I. KATSNELSON, T.M. KLAUWIJK, A. KNORR, C.H. MARROWS, A. MOREO, E. PAVARINI, S. RAO, H.R. SCHOBER, S.H. SIMON, R.R.P. SINGH, O.V. TCHERNYSHYOV, B.O. WELLS, X.C. XIE <i>Fluid Dynamics</i> J. DE BRUYN, J. EGGERS, G. FALKOVICH, R.L. LEHENY <i>Gravitational Physics</i> A. ASHTEKAR, E. BERTI <i>Laser Science</i> S.T. CUNDIFF, P.D. DRUMMOND, E. GIACOBINO, A. MAQUET, G-L. OPPO <i>Materials Physics</i> J. HLINKA, F. LIU <i>Nuclear Physics</i> C.N. DAVIDS, C. GALE, J. KOLATA, R. LIOTTA, J. VELKOVSKA <i>Particles and Fields</i> A. DE GOUVEA, T.A. DEGRAND, R. GOPAKUMAR, V. LUTH, W. VOGELSANG, C.E.M. WAGNER <i>Physics of Beams</i> A. WOLSKI <i>Plasma Physics</i> J. CHITTENDEN, J.S. DEGRASSIE, M.L. GOLDSTEIN, G. MORALES, V. TIKHONCHUK <i>Polymer Physics</i> M.W. MATSEN, P. OLMSTED, G. REITER <i>Foundations of Quantum Mechanics</i> C. MACCHIAVELLO <i>Quantum Information</i> J. EISERT, A.V. SERGIENKO, L. VIOLA <i>Statistical Physics and Nonlinear Dynamics</i> K. DANIELS, R. GOLESTANIAN, V. HAKIM, Y. KAFRI, R. KLAGES, Y. MORENO, S. REDNER, P. REIMANN, K. SNEPPEN	American Physical Society <i>President</i> ROGER FALCONE <i>Speaker of Council</i> TIMOTHY GAY <i>Chief Executive Officer</i> KATE P. KIRBY <i>Editor in Chief</i> MICHAEL THOENNESSEN <i>Publisher</i> MATTHEW SALTER <i>Chief Information Officer</i> MARK D. DOYLE <i>Chief Financial Officer</i> MARGARET BANDERA <i>Deputy Executive Officer and</i> <i>Chief Operating Officer</i> JAMES TAYLOR <i>Chief Government Affairs</i> <i>Officer</i> FRANCIS SLAKEY One Physics Ellipse College Park, MD 20740-3844 APS Editorial Office Directors <i>Editorial</i> DANIEL T. KULP <i>Journal Operations</i> CHRISTINE M. GIACCONE 1 Research Road Ridge, NY 11961-2701 Phone: (631) 591-4060 Email: prl@aps.org Web: https://journals.aps.org/ Submissions: https://authors.aps.org/Submissions/ 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 Email: subs@aps.org
--	--	---

Letters intended for this journal must be short and self-contained. Information for Contributors and a description of editorial Policies and Practices can be found at <http://journals.aps.org/prl/authors>.

Manuscripts should be **submitted** electronically in acceptable format (see <http://authors.aps.org/Submissions/>). Submission is a repudiation that the manuscript has not been published previously and is not currently under consideration for publication elsewhere. An executed APS **copyright-transfer** form (effective only on acceptance for publication) must be provided.

To help defray editorial and production expenses, authors of published Letters are expected to pay a **publication charge** of \$790 (\$285 for a Comment or Reply). Charges are higher (\$980 for a Letter, \$360 for a Comment or Reply) for those which are not submitted in an acceptable electronic format. Acceptable formats are REVTeX (preferred), L^AT_EX, plain T_EX, MS Word; PostScript figures (preferred). **Reprints** are offered for sale to corresponding authors.

For additional information regarding the online version of this journal, please visit: <http://journals.aps.org/prl/>. Institutional subscribers requesting address changes, filing claims, or requesting additional information, please contact the APS Subscription Services at subs@aps.org. Member subscribers requiring changes, claims or additional information should contact the APS Membership Department at membership@aps.org.

Copyright © 2018 American Physical Society. All rights reserved.

*Physical Review Letters*TM is a trademark of the American Physical Society, registered in the United States, Canada, European Union and Japan.

Rights and Permissions: <http://journals.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 via Aptara's SciPrisTM platform. To request permission to republish, refer to the Reuse and Permissions link that can be found on each APS article page and provide the requested information.

Other Use: Permission is granted to quote from the journal with the customary acknowledgment of the source. Permission must be sought using Aptara's SciPrisTM platform. To request permission to reproduce a figure, table, or excerpt of an article refer to the Reuse and Permissions link that can be found on each APS article page and provide the requested information. 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 [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.