# 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.*


**Lead Editor**

HUGUES CHATÉ

**Managing Editor**

ROBERT GARISTO

**Editor**

SAMINDRANATH MITRA

**Associate Editors**

ABHISHEK AGARWAL
ROCIO CORTES
AGNESE CURATOLO
SERENA DALENA
OLGA DUDKO
KEVIN DUSLING
SONJA GRONDALSKI
DONAVAN HALL
SAAD E. HEBBOUL
FRANK NARDUCCI
STOJAN REBIC
MARTIN RODRIGUEZ-VEGA
DANIEL UCKO
DENIZ VAN HEIJNSBERGEN
ALESSANDRO VILLAR
RAPHAEL VOITURIEZ
MU WANG
KYLE WELCH

**Assistant Editor**

VALERIE L. MILLER

**Editorial Board** ***(Divisional Associate Editors)***

***Astrophysics***
D. HOOPER, S. REDDY, T. SLATYER

***Atomic, Molecular, and Optical Physics***
L. DAVIDOVICH, M. DAVIS, P. DOMOKOS, J. J. GARCÍA-RIPOLI, N. LUTKENHAUS, M. PARISH, G. REMPE, H. RITSCH, M. VRAKKING, R. ZAMBRINI

***Biological Physics***
N. BRENNER, J.W. SHAEVITZ, L. TSIMRING

***Chemical Physics***
K. MORGENSTERN, A. TKATCHENKO

***Computational Physics***
A. GEORGES

***Condensed Matter Physics***
L. BALICAS, A. BLACK-SCHAFFER, Y. CHEN, A.L. CHERNYSHEV, P. DAI, L.E.F. FOÁ TORRES, K. LEHUR, A. PARAMEKANTI, E. PAVARINI, S. RAO, P. RINKE, F. RONNING, N. SAMARTH, E. SHIMSHONI, J. SINOVA, C. TIMM, E. TUTUC, D. VANDEMBROUCQ, K. YANG

***Energy Research and Applications***
M. BEARD

***Fluid Dynamics***
B. DUBRULLE, R. GOVINDARAJAN, A. PUMIR, L. RAMOS, E. WEEKS

***Gravitational Physics***
A. ASHTEKAR, E. BERTI

***Laser Science***
G-L. OPPO, D.D. YAVUZ

***Materials Physics***
N. BARRETT, J. HLINKA, Z-Y. LIU, S. REZENDE

***Nuclear Physics***
R. AVERBECK, H. ELFNER, J. GATES, C. MANUEL, P. PETRECZKY, D. VRETENAR, A. WUOSMAA

***Particles and Fields***
A. DE GOUVEA, M. DIEHL, L. EVERETT, D. KABAT, T. KOVACS, G. LANDSBERG

***Physics of Beams***
A. WOLSKI

***Plasma Physics***
J. CHITTENDEN, J.S. DEGRASSIE D. DUBIN, M. HOSHINO, A. POUQUET, V. TIKHONCHUK

***Polymer Physics***
K. DALNOKI-VERESS, X. MAO, D.J. READ, F. SCHMID

***Foundations of Quantum Mechanics***
J. BARRETT, C. MACCHIAVELLO

***Quantum Information***
D. LIDAR, A.V. SERGIENKO, F. VERSTRAETE, L. VIOLA

***Soft Matter***
K. DANIELS, K. MARTENS, A. WURGER

***Statistical Physics and Nonlinear Dynamics***
E. AGLIARI, A. BARRAT, M. ESPOSITO, R. GOLESTANIAN, P. GRASSBERGER, V. HAKIM, Y. KAFRI, S. PONCE DAWSON, S-I. SASA, I.M. SOKOLOV

**American Physical Society**

*President* FRANCES HELLMAN
*Speaker of the Council* ROBIN L.B. SELINGER
*Chief Executive Officer* JONATHAN A. BAGGER
*Editor in Chief* MICHAEL THOENNESSEN
*Chief Publications Officer* RACHEL BURLEY
*Director of Publishing* JEFF LEWANDOWSKI
*Chief Information Officer* MARK D. DOYLE
*Chief Finance and Operations Officer* JANE HOPKINS GOULD
*Chief Government Affairs Officer* FRANCIS SLAKEY
*Chief Human Resources Officer* BETH GUNZEL

One Physics Ellipse
College Park, MD 20740-3844

**APS Editorial Office**

*Executive Editor* JESSICA THOMAS
*Director, Journal Operations* CHRISTINE M. GIACCONE

100 Motor Parkway, Suite 100
Hauppauge, NY 11788
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 https://journals.aps.org/prl/authors.

**Manuscripts** should be **submitted** electronically in acceptable format (see https://authors.aps.org/Submissions/). Submission is a repretation 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.

Acceptable formats are REVTEX (preferred), LATEX, MS Word; PostScript figures are preferred. **Reprints** are offered for sale to corresponding authors.

For additional information regarding the online version of this journal, please visit: https://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 © 2022 American Physical Society. All rights reserved.**

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

**Rights and Permissions: https://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 SciPris™ platform. To request permission to republish, refer to the Reuse and Permissions link that can be found (online) 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 SciPris™ 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.**