

# PHYSICAL REVIEW E

## STATISTICAL, NONLINEAR, AND SOFT MATTER PHYSICS

### Editor

**GARY S. GREST**  
(Sandia National Laboratories)

### Associate Editors

**MICHAEL BRENNER**  
(Harvard University)

**BURKHARD DUENWEG**  
(Max-Planck-Institut fuer Polymerforschung)

**BRANT M. JOHNSON**  
(Brookhaven National Laboratory)

**MARGARET MALLOY**  
(APS Editorial Office)

**JOHN F. MARKO**  
(University of Illinois at Chicago)

**ANTONIO POLITI**  
(Istituto Nazionale di Ottica Applicata)

**MARK SAFFMAN**  
(University of Wisconsin)

**JONATHAN SELINGER**  
(Kent State University)

**ROBERT ZIFF**  
(University of Michigan)

### Senior Assistant Editors

**DIRK JAN BUKMAN**

**MARGARET FOSTER**

### Assistant Editors

**JILL M. GARGANO**

**VALERIE L. MILLER**

**JOANNA POPADIUK**

### Senior Editorial Assistant

**JOYCE MASTERSON**

### Editorial Assistants

**TERRE ARENA**

**JO-ANNE IZZO**

### EDITORIAL BOARD

#### Term ending 31 December 2005

|                |                                    |
|----------------|------------------------------------|
| N. ABRAHAM     | Chaos, Nonlinear Dynamics, Optics  |
| J. CARY        | Plasmas                            |
| P. HÄNGGI      | Statistical and Stochastic Physics |
| O. LAVRETOVICH | Liquid Crystals                    |
| D. LOHSE       | Turbulence                         |
| E. MARX        | Classical and Quantum Physics      |
| A. PIKOVSKY    | Nonlinear Physics                  |
| S. J. SCHIFF   | Biological Physics                 |
| M. WORTIS      | Biological and Statistical Physics |

#### Term ending 31 December 2006

|                |                                     |
|----------------|-------------------------------------|
| H. AREF        | Fluid Dynamics                      |
| J. BECHHOEFER  | Complex Fluids, Biological Physics  |
| E. BEN-NAIM    | Granular Materials                  |
| B. ECKHARDT    | Classical Chaos, Quantum Chaos      |
| M. GLASER      | Liquid Crystals                     |
| C. MOUKARZEL   | Statistical Physics                 |
| R. PODGORNİK   | Polymer Physics, Biological Physics |
| S. RAMASWAMY   | Complex Fluids                      |
| T. ROSER       | Beam Physics                        |
| B. SCHMITTMANN | Statistical Physics                 |

#### Term ending 31 December 2007

|                  |                                              |
|------------------|----------------------------------------------|
| G. AHLERS        | Critical Phenomena, Turbulence               |
| A. BARRAT        | Statistical Physics, Glasses                 |
| J.-P. BOUCHAUD   | Statistical Physics                          |
| R. BUNDSCHUH     | Biopolymers                                  |
| G. CASATI        | Quantum Chaos, Classical Chaos               |
| B. DROSSEL       | Complex Systems                              |
| W. FIRTH         | Nonlinear Optics, Optical Patterns, Solitons |
| R. KAPRAL        | Statistical Mechanics, Nonlinear Dynamics    |
| A. J. C. LADD    | Computational Physics                        |
| A. A. MARADUDIN  | Photonic Crystals                            |
| O. SCHILLING     | Fluid Mechanics, Turbulence                  |
| B. YA. ZELDOVICH | Electrodynamics                              |

**The American Physical Society**  
One Physics Ellipse  
College Park, MD 20740-3844

|                          |                    |
|--------------------------|--------------------|
| <i>President</i>         | MARVIN L. COHEN    |
| <i>President-Elect</i>   | JOHN BAHCALL       |
| <i>Vice-President</i>    | JOHN J. HOPFIELD   |
| <i>Editor-in-Chief</i>   | MARTIN BLUME       |
| <i>Treasurer</i>         |                    |
| <i>and Publisher</i>     | THOMAS J. MCILRATH |
| <i>Executive Officer</i> | JUDY R. FRANZ      |

### APS Editorial Office

1 Research Road, Box 9000  
Ridge, NY 11961-9000

Phone: (631) 591-4050

Fax: (631) 591-4141

Email: pre@aps.org

Web: <http://publish.aps.org/>

Submissions: [pretex@aps.org](mailto:pretex@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](mailto:membership@aps.org)

### Institutional Subscriptions:

### APS Subscription Services

Suite 1N01

2 Huntington Quadrangle

Melville, NY 11747-4502

Phone: (516) 576-2270, (800) 344-6902

Fax: (516) 349-9704

Email: [subs@aps.org](mailto:subs@aps.org)

**Manuscripts** should be submitted electronically in acceptable format (see <http://authors.aps.org/ESUB/> or inquire at [pretex@aps.org](mailto:pretex@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 must be provided (effective only on acceptance for publication); the form is available via our Web submission server and via <http://authors.aps.org/>. Information for contributors may be found on our Web server or in the January and July issues.

To help defray editorial and production expenses, authors of articles which are not submitted in acceptable electronic format are expected to pay a **publication charge** of \$115 plus \$115 per journal page. Acceptable formats are REV<sub>T</sub>EX (preferred), L<sup>A</sup>T<sub>E</sub>X, plain T<sub>E</sub>X; MS Word; PostScript figures. **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](mailto:assocpub@aps.org). **Member** inquiries regarding **subscriptions**, renewals, address changes, missing or damaged copies, microfilm, 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 © 2005 by The American Physical Society. All rights reserved.**  
*Physical Review E*™ is a trademark of The American Physical Society.

### Rights and Permissions

**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 \$23.00 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, The American Physical Society, One Physics Ellipse, College Park, MD 20740-3844; email: [assocpub@aps.org](mailto: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 E [ISSN: 1539-3755 (print), 1550-2376 (online); CODEN PLEEE8; printed in USA] is published monthly by The American Physical Society, 1 Research Road, Box 9000, Ridge, NY 11961-9000.

**POSTMASTER:** Send address changes to Physical Review E, APS Subscription Services, Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502. The 2005 print + online base price is \$2520. Periodicals postage rates are paid at Huntington Station, NY, and additional mailing offices.