

# THE BIOLOGICAL PHYSICIST

The Newsletter of the Division of Biological Physics of the American Physical Society

Vol 3 No 1 Apr 2003

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## In this Issue

### FEATURE

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## Introducing PRE Highlights!

Welcome to Volume 3 of THE BIOLOGICAL PHYSICIST. In this issue we inaugurate a new feature that will be regularly appearing in THE BIOLOGICAL PHYSICIST from now on: PRE Highlights.

PRE Highlights will provide you with a list of all the recent biological physics papers that have appeared in PRE over the past two months. Hopefully this will be a useful way to scan an important part of the literature at a glance. Along with the article citations, we will provide web links to the relevant issues of PRE where you can download articles of interest. Note that the current (April) issue of PRE is not yet complete – articles may be added until April 30. Because of this “offset” between the publication dates of PRE and THE BIOLOGICAL PHYSICIST, we will list February and March PRE articles in this issue, April and May PRE articles in the June issue, etc. This will avoid the potential problem of omitting any biological physics articles that might be published online toward the end of the month.

The minutes of the DBP Business Meeting and Executive Committee Meeting were not available to THE BIOLOGICAL PHYSICIST at press time. We hope to be able to bring you the minutes in the June issue.

Best,

*Sonya*

# *Biological Physics in the Physical Review*

*Margaret Foster, Margaret Malloy, Gary Grest  
and Frederick MacKintosh*

Are you aware of the broad range of topics in biological physics published in PRE and PRL? Topics of recent publications in the Biological Physics Section in PRE have included analysis of genes, protein folding, RNA folding, lipid bilayers, models of intracellular calcium patterns, dynamics of microtubules and polar filaments, biological networks, cardiac dynamics, neural networks, analyses of electroencephalograms, bacterial colonies, and epidemic models. Since 2001, Part I of PRE has been devoted to soft matter and biological physics. All the Physical Review journals are available online at <http://publish.aps.org/>, and abstracts of articles and letters published in the past three years are freely available to all. Recently the journal has offered free color online only for authors supplying color PostScript files. See the announcement at

<http://publish.aps.org/color03.html>.

Biological Physics is one of the fastest growing sections in PRE, with a 19% increase in submissions in 2002 compared to submissions in the previous year. We welcome submissions of papers appropriate for the biological physics sections in PRE and PRL. Guidelines for appropriate papers are given in the memo "Biological Physics papers in Physical Review E," available from <http://forms.aps.org/author.html>. Several years ago, MEDLINE began indexing biological physics papers published in PRE and PRL, so these papers should come to the attention of scientists working in related biological disciplines. The papers should also reach an international audience of readers, because of the international constituency of the Physical Review. The median time from receipt to acceptance for papers submitted directly to PRE in 2002 was 92 days for

articles and Brief Reports and 71 days for Rapid Communications. For manuscripts published in PRE in 2002, the median time from acceptance to publication was 74 days for articles and Brief Reports and 54 days for Rapid Communications. For Letters published in PRL in 2002, the median time from receipt to acceptance was 134 days and from acceptance to publication, 36 days.

We would like to thank the referees and the editorial board members, who share their expertise to help maintain the quality of the biological physics papers in the Physical Review. The current editorial board members for biological physics are Steven J. Schiff and Michael Wortis for PRE and Didier Chatenay and Marcelo Magnasco for PRL. In 2002, 674 referees were used for the 365 papers submitted to the Biological Physics section in PRE. We try to be considerate of the referees and not overburden them with review requests, so it is helpful when current referees and authors also recommend new potential referees. So that our review requests are on target, we encourage referees to log onto our referee server <http://referees.aps.org/>, when appropriate, in order to update their expertise and contact information.

*For Physical Review E,*

**Margaret C. Foster**, Senior Assistant Editor

**Margaret Malloy**, Associate Editor

**Gary Grest**, Editor

*For Physical Review Letters,*

**Frederick MacKintosh**,

Adjunct Associate Editor

**To contact these editors, please send email to [pre@aps.org](mailto:pre@aps.org). Be sure to write BIOLOGICAL PHYSICS in the subject line.**

# PRE HIGHLIGHTS

## FEBRUARY 2003

### Biological Physics Articles from Physical Review E

(Statistical, Nonlinear, and Soft Matter Physics)

Volume 67, Number 2, Articles (02xxxx)

<http://ojps.aip.org/dbt/dbt.jsp?KEY=PLLEE8&Volume=67&Issue=2>

## ARTICLES

### Robustness and enhancement of neural synchronization by activity-dependent coupling

*V. P. Zhigulin, M. I. Rabinovich, R. Huerta, and H. D. I. Abarbanel*

Published 6 February 2003 (4 pages)

021901

### Nonlinear dependence of the delayed luminescence yield on the intensity of irradiation in the framework of a correlated soliton model

*Larissa Brizhik, Francesco Musumeci, Agata Scordino, Maurizio Tedesco, and Antonio Triglia*

Published 12 February 2003 (7 pages)

021902

### Modeling oscillatory microtubule polymerization

*Martin Hammele and Walter Zimmermann*

Published 14 February 2003 (19 pages)

021903

### Energy resolution and dynamical heterogeneity effects on elastic incoherent neutron scattering from molecular systems

*Torsten Becker and Jeremy C. Smith*

Published 18 February 2003 (8 pages)

021904

### Enhanced migration and ionic transport through membranes

*Wilson Barros, Jr. and M. Engelsberg*

Published 19 February 2003 (5 pages)

021905

### Solution of epidemic models with quenched transients

*J. A. N. Filipe and C. A. Gilligan*

Published 19 February 2003 (8 pages)

021906

### Role of photonic-crystal-type structures in the thermal regulation of a Lycaenid butterfly sister species pair

*L. P. Biró, Zs. Bálint, K. Kertész, Z. Vértessy, G. I. Márk, Z. E. Horváth, J. Balázs, D. Méhn, I. Kiricsi, V. Lousse, and J.-P. Vigneron*

Published 19 February 2003 (7 pages)

021907

### Piecewise linear differential equations and integrate-and-fire neurons: Insights from two-dimensional membrane models

*Arnaud Tonnelier and Wulfram Gerstner*

Published 19 February 2003 (16 pages)

021908

### Size exclusion and diffusion of fluoresceinated probes within collagen fibrils

*A. Ekani-Nkodo and D. Kuchnir Fygenson*

Published 21 February 2003 (7 pages)

021909

### Theory of ac electrokinetic behavior of spheroidal cell suspensions with an intrinsic dispersion

*Lei Gao, J. P. Huang, and K. W. Yu*

Published 24 February 2003 (10 pages)

021910

### Interstrand distance distribution of DNA near melting

*M. Baiesi, E. Carlon, Y. Kafri, D. Mukamel, E. Orlandini, and A. L. Stella*

Published 24 February 2003 (6 pages)

021911

### Automated detection of a preseizure state based on a decrease in synchronization in intracranial electroencephalogram recordings from epilepsy patients

*Florian Mormann, Ralph G. Andrzejak, Thomas Kreuz, Christoph Rieke, Peter David, Christian E. Elger, and Klaus Lehnertz*

Published 26 February 2003 (10 pages)

021912

### Evolution equation of population genetics: Relation to the density-matrix theory of quasiparticles with general dispersion laws

**V. Bezák**

Published 27 February 2003 (10 pages)  
021913

**Statistical physics of RNA folding**

*M. Müller*

Published 27 February 2003 (17 pages)  
021914

**Modeling postshock evolution of large electropores**

*John C. Neu and Wanda Krassowska*

Published 27 February 2003 (12 pages)  
021915

**BRIEF REPORTS**

**Stationary transmission distribution of random spike trains by dynamical synapses**

*Richard H. R. Hahnloser*

Published 10 February 2003 (4 pages)  
022901

**Electromagnetic optimization of light-harvesting proteins**

*P. Etchegoin and R. C. Maher*

Published 13 February 2003 (4 pages)  
022902

**Correlated noise in a logistic growth model**

*Bao-Quan Ai, Xian-Ju Wang, Guo-Tao Liu, and Liang-Gang Liu*

Published 27 February 2003 (3 pages)  
022903

**MARCH 2003**

**Biological Physics Articles from Physical Review E**

(Statistical, Nonlinear, and Soft Matter Physics)

**Volume 67, Number 3, Articles (03xxxx)**

<http://ojps.aip.org/dbt/dbt.jsp?KEY=PLLEE8&Volume=67&Issue=3>

**RAPID COMMUNICATIONS**

**Effect of divalent counterions on asymmetrically charged lipid bilayers**

*Bae-Yeun Ha*

Published 18 March 2003 (4 pages) 030901(R)

**ARTICLES**

**Steric constraints as folding coadjuvant**

*M. E. P. Tarragó, Luiz F. O. Rocha, R. A. daSilva, and A. Caliri*

Published 10 March 2003 (7 pages)

031901

**Iterative signature algorithm for the analysis of large-scale gene expression data**

*Sven Bergmann, Jan Ihmels, and Naama Barkai*

Published 11 March 2003 (18 pages)  
031902

**Detecting scaling in the period dynamics of multimodal signals: Application to Parkinsonian tremor**

*Nir Sapir, Roman Karasik, Shlomo Havlin, Ely Simon, and Jeffrey M. Hausdorff*

Published 11 March 2003 (8 pages)  
031903

**Condition for alternans and stability of the 1:1 response pattern in a "memory" model of paced cardiac dynamics**

*E. G. Tolkacheva, D. G. Schaeffer, Daniel J. Gauthier, and W. Krassowska*

Published 12 March 2003 (10 pages)  
031904

**Selection of intracellular calcium patterns in a model with clustered Ca<sup>2+</sup> release channels**

*J. W. Shuai and P. Jung*

Published 13 March 2003 (8 pages)  
031905

**Hydrodynamics of bacterial colonies: A model**

*J. Lega and T. Passot*

Published 13 March 2003 (18 pages)  
031906

**Nonequilibrium phase transition in a self-activated biological network**

*Hugues Berry*

Published 14 March 2003 (9 pages)  
031907

**Tumbling of vesicles under shear flow within an advected-field approach**

*T. Biben and C. Misbah*

Published 17 March 2003 (5 pages)  
031908

**Anomalous fluctuations of active polar filaments**

*Tanniemola B. Liverpool*

Published 18 March 2003 (5 pages)  
031909

**Unfolding proteins in an external field: Can we always observe the intermediate states?**

*Alexander S. Lemak, James R. Lepock, and Jeff Z. Y. Chen*  
Published 19 March 2003 (6 pages)  
031910

**Propagation and immunization of infection on general networks with both homogeneous and heterogeneous components**  
*Zonghua Liu, Ying-Cheng Lai, and Nong Ye*  
Published 19 March 2003 (5 pages)  
031911

**Fluid transport in branched structures with temporary closures: A model for quasistatic lung inflation**  
*Arnab Majumdar, Adriano M. Alencar, Sergey V. Buldyrev, Zoltán Hantos, H. Eugene Stanley, and Béla Suki*  
Published 20 March 2003 (12 pages)  
031912

**Dispersal of spores following a persistent random walk**  
*D. J. Bicout and I. Sache*  
Published 20 March 2003 (7 pages)  
031913

**Robustness and perturbation in the modeled cascade heart rate variability**  
*D. C. Lin*  
Published 24 March 2003 (8 pages)  
031914

**Survival-extinction phase transition in a bit-string population with mutation**  
*Kathia M. Fehsenfeld, Ronald Dickman, and Américo T. Bernardes*  
Published 24 March 2003 (5 pages)  
031915

**Analysis of globally connected active rotators with excitatory and inhibitory connections using the Fokker-Planck equation**  
*Takashi Kanamaru and Masatoshi Sekine*  
Published 24 March 2003 (8 pages)  
031916

**Ellipsoidal particles driven by intensity gradients through viscous fluids**  
*T. Ambjörnsson and S. P. Apell*  
Published 25 March 2003 (7 pages)  
031917

**Stochastic population dynamics: The Poisson approximation**  
*Hernán G. Solari and Mario A. Natiello*  
Published 26 March 2003 (12 pages)  
031918

**Adhesion-induced phase separation of multiple species of membrane junctions**  
*Hsuan-Yi Chen*  
Published 26 March 2003 (10 pages)  
031919

**Patterns in randomly evolving networks: Idiotypic networks**  
*Markus Brede and Ulrich Behn*  
Published 31 March 2003 (18 pages)  
031920

## **BRIEF REPORTS**

**Influence of the sequence on elastic properties of long DNA chains**  
*C. Vaillant, B. Audit, C. Thermes, and A. Arnéodo*  
Published 11 March 2003 (4 pages)  
032901

**Interpretation of scaling properties of electroencephalographic fluctuations via spectral analysis and underlying physiology**  
*P. A. Robinson*  
Published 17 March 2003 (4 pages)  
032902

**Evolutionary advantage of diploidal over polyploidal sexual reproduction**  
*A. O. Sousa, S. Moss de Oliveira, and J. S. Sá Martins*  
Published 20 March 2003 (3 pages)  
032903