# PHYSICAL REVIEW B

For editorial and subscription correspondence,
please see inside front cover
(ISSN: 0163-1829)

PERIODICALS
Postmaster send address changes to:
American Institute of Physics
Suite 1NO1
2 Huntington Quadrangle
Melville, NY 11747-4502

THIRD SERIES, VOLUME 60, NUMBER 18 *CONTENTS* 1 NOVEMBER 1999-II

## RAPID COMMUNICATIONS

**Structure, structural phase transitions, mechanical properties, defects, etc.**

Martensitic textures: Multiscale consequences of elastic compatibility . . . . . R12 537
S. R. Shenoy, T. Lookman, A. Saxena, and A. R. Bishop

**Inhomogeneous, disordered, and partially ordered systems**

Why $Pb(B,B')O_3$ perovskites disorder at lower temperatures than $Ba(B,B')O_3$ perovskites . . . . . R12 542
B. P. Burton and E. Cockayne

**Dynamics, dynamical systems, lattice effects, quantum solids, etc.**

Consistent model for the screening of slow muons in metals . . . . . R12 546
I. Nagy, B. Apagyi, J. I. Juaristi, and P. M. Echenique
Dynamic coupling of crystal-field and phonon states in $YbPO_4$ . . . . . R12 549
C.-K. Loong, M. Loewenhaupt, J. C. Nipko, M. Braden, and L. A. Boatner

**Magnetism**

Electron spin resonance of defects in the Haldane system $Y_2BaNiO_5$ . . . . . R12 553
C. D. Batista, K. Hallberg, and A. A. Aligia
Electronic structure of the spin-$\frac{1}{2}$ chain compound $MgVO_3$ . . . . . R12 557
I. Chaplygin, R. Hayn, and K. Koepernik
Atomic arrangement and magnetic properties of $LaFeO_3$-$LaMnO_3$ artificial superlattices . . . . . R12 561
Kenji Ueda, Hitoshi Tabata, and Tomoji Kawai
Infrared probe of the electronic structure and carrier scattering in NiMnSb thin films . . . . . R12 565
F. B. Mancoff, B. M. Clemens, E. J. Singley, and D. N. Basov
Soft-x-ray resonant scattering from V/Fe (001) magnetic superlattices . . . . . R12 569
Maurizio Sacchi, Alessandro Mirone, Coryn F. Hague, Jean-Michel Mariot, Luca Pasquali, Peter Isberg, Eric M. Gullikson, and James H. Underwood

**Superfluidity and superconductivity**

Predicted giant magnetic moment on non-$\{n0m\}$ surfaces of $d$-wave superconductors . . . . . R12 573
Chia-Ren Hu and Xin-Zhong Yan
Nonlocal effects in angular dependence of in-plane magnetization of tetragonal superconductors . . . . . R12 577
V. G. Kogan, S. L. Bud'ko, P. C. Canfield, and P. Miranović
Charge fluctuations in a quantum point contact attached to a superconducting lead . . . . . R12 581
Andrew M. Martin, Thomas Gramespacher, and Markus Büttiker

Copyright 1999 by The American Physical Society

0163-1829(19991101)60:18;1-F

*(Continued)*

**PHYSICAL REVIEW B** **THIRD SERIES, VOLUME 60, NUMBER 18** **1 NOVEMBER 1999-II**

Interstitial flux phases in a superconducting niobium film with a square lattice of artificial pinning centers ..... R12 585
V. Metlushko, U. Welp, G. W. Crabtree, R. Osgood, S. D. Bader, L. E. DeLong, Zhao Zhang, S. R. J. Brueck, B. Ilic, K. Chung, and P. J. Hesketh

Structure of flux line lattices with weak disorder at large length scales ..... R12 589
Philip Kim, Zhen Yao, Cristian A. Bolle, and Charles M. Lieber

Giant peak effect observed in an ultrapure $YBa_2Cu_3O_{6.993}$ crystal ..... R12 593
Jing Shi, X. S. Ling, Ruixing Liang, D. A. Bonn, and W. N. Hardy

Magnetic interactions and magnon gap in the ferromagnetic superconductor $RuSr_2GdCu_2O_8$ ..... R12 597
A. Fainstein, E. Winkler, A. Butera, and J. Tallon

## ARTICLES

### Structure, structural phase transitions, mechanical properties, defects, etc.

Interaction and energy transfer between divalent Sm ions and $CN^-$ molecular defects in KCl ..... 12 601
V. Dierolf

Direct simulation of ion-beam-induced stressing and amorphization of silicon ..... 12 610
Keith M. Beardmore and Niels Grønbech-Jensen

Electronic structure and spectral properties of paramagnetic point defects in $Si_3N_4$ ..... 12 617
Gianfranco Pacchioni and Davide Erbetta

Stimulated emission at 326 nm and an ultrafast 100-ps-lived luminescence component by ion irradiation of $\alpha$-alumina ..... 12 626
Kazuie Kimura, Junichi Kaneko, Sumit Sharma, Wan Hong, and Noriaki Itoh

High-pressure Raman investigation of mutual solubility and compound formation in Xe-$N_2$ and Ne-$N_2$ ..... 12 635
M. E. Kooi and J. A. Schouten

Infrared absorption study of Fermi resonance and hydrogen-bond symmetrization of ice up to 141 GPa ..... 12 644
M. Song, H. Yamawaki, H. Fujihisa, M. Sakashita, and K. Aoki

High-pressure phase transition and properties of spinel $ZnMn_2O_4$ ..... 12 651
S. Åsbrink, A. Waśkowska, L. Gerward, J. Staun Olsen, and E. Talik

### Inhomogeneous, disordered, and partially ordered systems

Adsorption-desorption isotherms and x-ray diffraction of Ar condensed into a porous glass matrix ..... 12 657
P. Huber and K. Knorr

Solid $N_2$ and CO in nanoporous glasses ..... 12 666
P. Huber, D. Wallacher, and K. Knorr

Helical single-lamellar crystals thermotropically formed in a synthetic nonracemic chiral main-chain polyester .... 12 675
Christopher Y. Li, Donghang Yan, Stephen Z. D. Cheng, Feng Bai, Jason J. Ge, Bret H. Calhoun, Tianbai He, Liang-Chy Chien, Frank W. Harris, and Bernard Lotz

Neutron-diffraction study of bulk amorphous $Al_{32}Ge_{68}$ alloy ..... 12 681
A. I. Kolesnikov, U. Dahlborg, M. Calvo-Dahlborg, O. I. Barkalov, E. G. Ponyatovsky, W. S. Howells, and A. I. Harkunov

Symmetry of the atomic displacement field at the quasicrystal-to-crystal phase transition ..... 12 687
S. B. Rochal

Scattering of light from an amplifying medium bounded by a randomly rough surface ..... 12 692
Andriy V. Tutov, Alexei A. Maradudin, Tamara A. Leskova, Andreas P. Mayer, and José A. Sánchez-Gil

Effective dielectric function of a random medium ..... 12 705
S. E. Skipetrov

*(Continued)*

**PHYSICAL REVIEW B** **THIRD SERIES, VOLUME 60, NUMBER 18** **1 NOVEMBER 1999-II**

**Dynamics, dynamical systems, lattice effects, quantum solids, etc.**

Common force field for graphite and polycyclic aromatic hydrocarbons . . . . . 12 710
C. Mapelli, C. Castiglioni, G. Zerbi, and K. Müllen
*Ab initio* study of the $Se_S$ local oscillator in zinc sulfide . . . . . 12 726
K. Petzke
Quasielastic light scattering from rutile . . . . . 12 730
A. Koreeda, M. Yoshizawa, S. Saikan, and M. Grimsditch
Sliding mode and breaking of analyticity in the double-chain model of incommensurate composites . . . . . 12 737
O. Radulescu and T. Janssen
Complex ac conductivity of a carbon black composite as a function of frequency, composition, and temperature . . 12 746
D. S. McLachlan and Michael B. Heaney
Exact results for thermodynamics of the classical field theories: Sine-Gordon and sinh-Gordon models . . . . . 12 752
Emiliano Papa and Alexei M. Tsvelik
Local lattice distortions and Raman spectra in the $La_{1-x}Ca_xMnO_3$ system . . . . . 12 758
E. Liarokapis, Th. Leventouri, D. Lampakis, D. Palles, J. J. Neumeier, and D. H. Goodwin
Distribution of relaxation times from dielectric spectroscopy using Monte Carlo simulated annealing: Application to $\alpha$-PVDF . . . . . 12 764
A. Bello, E. Laredo, and M. Grimau
Dipole moments of $H_2$, $D_2$, and HD molecules in Czochralski silicon . . . . . 12 775
R. C. Newman, R. E. Pritchard, J. H. Tucker, and E. C. Lightowlers

**Magnetism**

Ground state and excitations of a spin chain with orbital degeneracy . . . . . 12 781
You-Quan Li, Michael Ma, Da-Ning Shi, and Fu-Chun Zhang
Improved approach to spin-polarized relativistic LMTO formalism: Application to the electronic structure of Fe-Ni compounds at the Earth's core conditions . . . . . 12 788
A. E. Krasovskii
Low-lying magnetic excitations in $Ni_3Al$ and their suppression by a magnetic field . . . . . 12 799
Anita Semwal and S. N. Kaul
Localized modes in two-dimensional square anisotropic ferromagnets with a hole . . . . . 12 810
Mari Kubota, Kazuko Kawasaki, and Shozo Takeno
Theoretical treatment of the mixed ferro-ferrimagnets composed of ternary-metal Prussian blue analogs in a paramagnetic region . . . . . 12 820
Shin-ichi Ohkoshi and Kazuhito Hashimoto
Growth-induced magnetic anisotropy and clustering in vapor-deposited Co-Pt alloy films . . . . . 12 826
A. L. Shapiro, P. W. Rooney, M. Q. Tran, F. Hellman, K. M. Ring, K. L. Kavanagh, B. Rellinghaus, and D. Weller
Competing interfacial exchange and Zeeman energies in exchange biased bilayers . . . . . 12 837
C. Leighton, J. Nogués, Harry Suhl, and Ivan K. Schuller
Magnetic anisotropy of $4d$-transition-metal monolayers: The role of low-energy valence bands . . . . . 12 841
R. Gómez-Abal and A. M. Llois
Field-induced transition in the paramagnetic state of $(Sm_{0.65}Sr_{0.35})MnO_3$ associated with magnetic clusters . . . . . 12 847
R. P. Borges, F. Ott, R. M. Thomas, V. Skumryev, J. M. D. Coey, J. I. Arnaudas, and L. Ranno
Electronic and magnetic structure of thin Ni films on Co/Cu(001) . . . . . 12 852
S. S. Dhesi, H. A. Dürr, G. van der Laan, E. Dudzik, and N. B. Brookes
Magnetic stability at the surface in strongly correlated electron systems . . . . . 12 861
T. Herrmann and W. Nolting

*(Continued)*

**PHYSICAL REVIEW B** **THIRD SERIES, VOLUME 60, NUMBER 18** **1 NOVEMBER 1999-II**

Neutron diffraction studies on a ferromagnetic layered manganite $La_{2-2x}Sr_{1+2x}Mn_2O_7$ ($x=0.3$) prepared by a ceramic method . . . . . 12 867
Eun-Ok Chi, Kun-Pyo Hong, Young-Uk Kwon, N. P. Raju, John E. Greedan, Jeong-Soo Lee, and Nam Hwi Hur
Spin dynamics of the spin-Peierls transition in a quantum Heisenberg antiferromagnetic chain . . . . . 12 874
Atsuko Kouzuki, Kazuko Kawasaki, and Katsuhiro Nakamura
Quantum-classical phase transition of escape rates in biaxial spin particles . . . . . 12 886
Y.-B. Zhang, J.-Q. Liang, H. J. W. Müller-Kirsten, S.-P. Kou, X.-B. Wang, and F.-C. Pu
Nonlinear magnetization dynamics of the classical ferromagnet with two single-ion anisotropies in an external magnetic field . . . . . 12 893
Wu-Ming Liu, Wu-Shou Zhang, Fu-Cho Pu, and Xin Zhou
Site-diluted three-dimensional Ising model with long-range correlated disorder . . . . . 12 912
H. G. Ballesteros and G. Parisi
Spin-glass-like behavior in mechanically alloyed nanocrystalline Fe-Al-Cu . . . . . 12 918
J. A. De Toro, M. A. López de la Torre, J. M. Riveiro, R. Sáez Puche, A. Gómez-Herrero, and L. C. Otero-Díaz
Magnetic properties of low-dimensional quantum spin systems made of stable organic biradicals PNNNO, $F_2$PNNNO, and PIMNO . . . . . 12 924
Yuko Hosokoshi, Yasuhiro Nakazawa, Katsuya Inoue, Kohichi Takizawa, Hiroki Nakano, Minoru Takahashi, and Tsuneaki Goto
Induced ferromagnetism and anisotropy of Pt layers in Fe/Pt(001) multilayers . . . . . 12 933
W. J. Antel, Jr., M. M. Schwickert, Tao Lin, W. L. O'Brien, and G. R. Harp
Magnetic properties of the Fe-intercalated misfit-layer compounds $(RS)_x[Fe_{0.33}(NbS_2)_2]$ ($R$=La,Ce) . . . . . 12 941
Chishiro Michioka and Kazuya Suzuki
Antiferromagnetic coupling in fcc Fe overlayers on Ni/Cu(100) . . . . . 12 945
B. Schirmer and M. Wuttig
Temperature dependence of exchange bias in polycrystalline ferromagnet-antiferromagnet bilayers . . . . . 12 950
M. D. Stiles and R. D. McMichael
Aperiodical oscillation of interlayer coupling in epitaxial Co/Ir(001) superlattices . . . . . 12 957
H. Yanagihara, Eiji Kita, and M. B. Salamon
Microscopic electronic phase separation and metal-insulator transition in $Nd_{0.5}Sr_{0.5}MnO_3$ . . . . . 12 963
N. Fukumoto, S. Mori, N. Yamamoto, Y. Moritomo, T. Katsufuji, C. H. Chen, and S-W. Cheong
Effective transfer integrals for the Jahn-Teller distortion in $LaMnO_3$ . . . . . 12 968
J. W. Liu, Z. Zeng, Q. Q. Zheng, and H. Q. Lin
Critical behavior of the random Potts chain . . . . . 12 974
E. Carlon, C. Chatelain, and B. Berche
Fully relativistic description of the magneto-optical properties of arbitrary layered systems . . . . . 12 982
T. Huhne and H. Ebert
*Ab initio* calculations on the mechanism of charge transfer in Co-Fe Prussian-blue compounds . . . . . 12 990
T. Kawamoto, Y. Asai, and S. Abe
Scaling functions of interfacial tensions for a class of Ising cylinders . . . . . 12 994
T. M. Liaw, M. C. Huang, S. C. Lin, and M. C. Wu
Half-metallic ferrimagnetism in $Mn_2VAl$ . . . . . 13 006
Ruben Weht and Warren E. Pickett
Incoherent-to-coherent crossover of optical spectra in $La_{0.825}Sr_{0.175}MnO_3$: Temperature-dependent reflectivity spectra measured on cleaved surfaces . . . . . 13 011
K. Takenaka, Y. Sawaki, and S. Sugai

*(Continued)*

**PHYSICAL REVIEW B** **THIRD SERIES, VOLUME 60, NUMBER 18** **1 NOVEMBER 1999-II**

Magnetotransport in conducting composite films with a disordered columnar microstructure and an in-plane magnetic field . . . . . 13 016
David J. Bergman and Yakov M. Strelniker

**Superfluidity and superconductivity**

Variational approach to the many-boson problem in one dimension . . . . . 13 028
E. Krotscheck, M. D. Miller, and J. Wojdylo
Properties of $^4$He in one dimension . . . . . 13 038
E. Krotscheck and M. D. Miller
Comparison of bulk $R_{2-z}Ce_zCuO_4$ with superlattice $R_{2-z}Ce_zCuO_4/SrO/NbO_2/SrO/CuO_2$ . . . . . 13 051
Howard A. Blackstead and John D. Dow
Relationship between incommensurability and superconductivity in Peierls-distorted charge-density-wave systems . . . . . 13 056
G. Seibold and S. Varlamov
Anisotropic impurities in anisotropic superconductors . . . . . 13 062
Miodrag L. Kulić and Oleg V. Dolgov
Projected SO(5) models . . . . . 13 070
Shou-Cheng Zhang, Jiang-Ping Hu, Enrico Arrigoni, Werner Hanke, and Assa Auerbach
Pseudogap formation in an electronic system with *d*-wave attraction at low density . . . . . 13 085
Takashi Hotta, Matthias Mayr, and Elbio Dagotto
Effects of Sr substitution on dimensionality and superconducting properties of $Hg_{0.7}Pb_{0.3}Ba_2Ca_2Cu_3O_y$ . . . . . 13 094
Yi Zhuo, Su-Mi Oh, Jae-Hyuk Choi, Mun-Seog Kim, Sung-Ik Lee, N. P. Kiryakov, M. S. Kuznetsov, and Sergey Lee
Vortex liquid entanglement in twinned $YBa_2Cu_3O_7/Y_2BaCuO_5$ composite superconductors . . . . . 13 099
T. Puig, F. Galante, E. M. González, J. L. Vicent, B. Martínez, and X. Obradors
Upper critical field $H_{c_3}$ for a thin-film superconductor with a ferromagnetic dot . . . . . 13 107
Sa-Lin Cheng and H. A. Fertig
Thin superconducting disk with *B*-dependent $J_c$: Flux and current distributions . . . . . 13 112
D. V. Shantsev, Y. M. Galperin, and T. H. Johansen
Correlation between weak ferromagnetism and crystal symmetry in $Gd_2CuO_4$-type cuprates . . . . . 13 119
H. M. Luo, Y. Y. Hsu, B. N. Lin, Y. P. Chi, T. J. Lee, and H. C. Ku
Nonlinear current response of a *d*-wave superfluid . . . . . 13 125
T. Dahm and D. J. Scalapino
Nonequilibrium in Josephson junctions: A possibility for low-energy radiation/particle detection . . . . . 13 131
G. Pepe, G. Ammendola, G. Peluso, A. Barone, E. Esposito, L. Parlato, and B. Ivlev
Critical currents in ballistic two-dimensional InAs-based superconducting weak links . . . . . 13 135
J. P. Heida, B. J. van Wees, T. M. Klapwijk, and G. Borghs
Superfluid flow past an array of scatterers . . . . . 13 139
D. Taras-Semchuk and J. M. F. Gunn
Resonances in spatially modulated long Josephson junctions . . . . . 13 152
M. V. Fistul, P. Caputo, and A. V. Ustinov
Matching fields of a long superconducting film . . . . . 13 158
Edson Sardella, M. M. Doria, and P. R. S. Netto
Magnetic properties of the transition to localized superconductivity around columnar defects . . . . . 13 164
Mauro M. Doria and Sarah C. B. de Andrade
X-ray fluorescence measurements of organic superconductors $\kappa$-$(ET)_2Cu[N(CN)_2]Br$ and $\kappa$-$(ET)_2Cu(NCS)_2$ . . . . . 13 169
E. Z. Kurmaev, S. N. Shamin, Y.-N. Xu, W. Y. Ching, A. Moewes, D. L. Ederer, E. B. Yagubskii, and N. D. Kushch
Large pinning efficiency of orthogonal columnar defects in a weakly anisotropic high-$T_c$ superconductor . . . . . 13 175
S. Hébert, V. Hardy, Ch. Simon, and J. Provost

*(Continued)*

**PHYSICAL REVIEW B** **THIRD SERIES, VOLUME 60, NUMBER 18** **1 NOVEMBER 1999-II**

Shape of a moving fluxon in stacked Josephson junctions . . . . . 13 179
V. M. Krasnov and D. Winkler

Anomalous behavior of the irreversible magnetization and time relaxation in $YBa_2Cu_3O_7$ single crystals with splayed tracks . . . . . 13 189
A. Silhanek, D. Niebieskikwiat, L. Civale, M. A. Avila, O. Billoni, and D. Casa

Systematics of *c*-axis phonons in the thallium- and bismuth-based cuprate superconductors . . . . . 13 196
A. A. Tsvetkov, D. Dulić, D. van der Marel, A. Damascelli, G. A. Kaljushnaia, J. I. Gorina, N. N. Senturina, N. N. Kolesnikov, Z. F. Ren, J. H. Wang, A. A. Menovsky, and T. T. M. Palstra

**Cumulative Author Index** . . . . . 13 206