PHYSICAL REVIEW D

For editorial and subscription correspondence, please see inside front cover
(ISSN: 0556-2821)

PERIODICALS
Postmaster send address changes to:
PHYSICAL REVIEW D
APS Subscription Services
Suite 1NO1
2 Huntington Quadrangle
Melville, NY 11747-4502

THIRD SERIES, VOLUME 69, NUMBER 12 ***CONTENTS*** **D15 JUNE 2004**

RAPID COMMUNICATIONS

Neutron moderation in the Oklo natural reactor and the time variation of α *(5 pages)* . . . . . 121701(R)
S. K. Lamoreaux and J. R. Torgerson

ARTICLES

Analysis of LIGO data for gravitational waves from binary neutron stars *(16 pages)* 122001
B. Abbott *et al.* (LIGO Scientific Collaboration)
Tracking quintessence would require two cosmic coincidences *(8 pages)* 122002
Sidney Bludman
Strong coupling versus 4D locality in induced gravity *(9 pages)* 122003
M. Porrati and J.-W. Rombouts
Analysis of first LIGO science data for stochastic gravitational waves *(24 pages)* 122004
B. Abbott *et al.* (LIGO Scientific Collaboration)
Growth of correlations in gravitational *N*-body simulations *(14 pages)* 123001
Thierry Baertschiger and Francesco Sylos Labini
Possible effects of space-time nonmetricity on neutrino oscillations *(7 pages)* 123002
M. Adak, T. Dereli, and L. H. Ryder
Exact likelihood evaluations and foreground marginalization in low resolution WMAP data *(14 pages)* 123003
Anže Slosar, Uroš Seljak, and Alexey Makarov
Neutrino processes in strong magnetic fields and implications for supernova dynamics *(16 pages)* 123004
Huaiyu Duan and Yong-Zhong Qian
Annual modulation of the galactic binary confusion noise background and LISA data analysis *(8 pages)* 123005
Naoki Seto
Using entropy to discriminate annihilation channels in neutralinos making up galactic halos *(7 pages)* 123006
Luis G. Cabral-Rosetti, Xavier Hernández, and Roberto A. Sussman
Current cosmological bounds on neutrino masses and relativistic relics *(10 pages)* 123007
Patrick Crotty, Julien Lesgourgues, and Sergio Pastor
ASYMFAST: A method for convolving maps with asymmetric main beams *(9 pages)* 123008
M. Tristram, J. F. Macías-Pérez, C. Renault, and J.-Ch. Hamilton
Slowly rotating general relativistic superfluid neutron stars with relativistic entrainment *(13 pages)* 123009
G. L. Comer
Effects of atmospheric electric fields on cosmic rays *(13 pages)* 123010
Yasushi Muraki *et al.*
A travel guide to the dark matter annihilation signal *(10 pages)* 123501
N. W. Evans, F. Ferrer, and S. Sarkar
Tracking solutions in tachyon cosmology *(5 pages)* 123502
Juan M. Aguirregabiria and Ruth Lazkoz



Copyright 2004 by The American Physical Society



(Continued)

PHYSICAL REVIEW D **THIRD SERIES, VOLUME 69, NUMBER 12** **D15 JUNE 2004**

Low energy effective action on a self-gravitating D-brane *(7 pages)* 123503
Sumitada Onda, Tetsuya Shiromizu, Kazuya Koyama, and Shoko Hayakawa
Nonsingular FRW cosmology and nonlinear electrodynamics *(10 pages)* 123504
C. S. Camara, M. R. de Garcia Maia, J. C. Carvalho, and J. A. S. Lima
Weakly interacting massive particle diffusion in the solar system including solar depletion and its effect on Earth capture rates *(18 pages)* 123505
Johan Lundberg and Joakim Edsjö
Big bang nucleosynthesis with a varying fine structure constant and nonstandard expansion rate *(5 pages)* . . . 123506
Kazuhide Ichikawa and Masahiro Kawasaki
String production at the level of effective field theory *(10 pages)* 123507
Steven S. Gubser
Energy-momentum tensor of cosmological fluctuations during inflation *(15 pages)* 123508
F. Finelli, G. Marozzi, G. P. Vacca, and G. Venturi
Models of inflation liberated by the curvaton hypothesis *(14 pages)* 123509
Konstantinos Dimopoulos and David H. Lyth
Explaining $\Omega_{\mathrm{baryon}} \approx 0.2\Omega_{\mathrm{dark}}$ through the synthesis of ordinary matter from mirror matter: A more general analysis *(10 pages)* 123510
R. Foot and R. R. Volkas
Reconstructing the dark energy equation of state with varying alpha *(7 pages)* 123511
N. J. Nunes and James E. Lidsey
Tachyons, scalar fields, and cosmology *(16 pages)* 123512
Vittorio Gorini, Alexander Kamenshchik, Ugo Moschella, and Vincent Pasquier
Sneutrino brane inflation and leptogenesis *(7 pages)* 123513
M. C. Bento, R. González Felipe, and N. M. C. Santos
Time evolution of tunneling in a thermal medium: Environment-driven excited tunneling *(13 pages)* 123514
Sh. Matsumoto and M. Yoshimura
Chaotic scalar fields as models for dark energy *(13 pages)* 123515
Christian Beck
Coupled dark energy: Parameter constraints from *N*-body simulations *(10 pages)* 123516
A.V. Macciò, C. Quercellini, R. Mainini, L. Amendola, and S.A. Bonometto
Extended tachyon field, Chaplygin gas, and solvable *k*-essence cosmologies *(10 pages)* 123517
Luis P. Chimento
Antimatter from cosmological baryogenesis and the anisotropies and polarization of CMB radiation *(8 pages)* 123518
Pavel D. Naselsky and Lung-Yih Chiang
Solar neutrino constraints on the BBN production of Li *(10 pages)* 123519
Richard H. Cyburt, Brian D. Fields, and Keith A. Olive
Coupled oscillators as models of phantom and scalar field cosmologies *(8 pages)* 123520
Valerio Faraoni
Fermionic partner of the quintessence field as a candidate for dark matter *(5 pages)* 123521
Xiao-Jun Bi, Mingzhe Li, and Xinmin Zhang
Off-equilibrium dynamics of the primordial perturbations in the inflationary universe: The $O(N)$ model *(12 pages)* 123522
Wolung Lee, Yeo-Yie Charng, Da-Shin Lee, and Li-Zhi Fang
Density perturbations in generalized Einstein scenarios and constraints on nonminimal couplings from the cosmic microwave background *(11 pages)* 123523
Shinji Tsujikawa and Burin Gumjudpai
The end of unified dark matter? *(7 pages)* 123524
Håvard B. Sandvik, Max Tegmark, Matias Zaldarriaga, and Ioav Waga

(Continued)

PHYSICAL REVIEW D **THIRD SERIES, VOLUME 69, NUMBER 12** **D15 JUNE 2004**

Generalized quantum theory of recollapsing homogeneous cosmologies *(23 pages)* 123525
David Craig and James B. Hartle
Physically adequate proper reference system of a test observer and relativistic description of the GAIA attitude *(9 pages)* 124001
Sergei A. Klioner
Electrovacuum static counterrotating relativistic dust disks *(14 pages)* 124002
Gonzalo García R. and Guillermo A. González
Remark on multiple vacua, particle production, and the time-dependent AdS/CFT correspondence *(7 pages)* 124003
Vijay Balasubramanian, Thomas S. Levi, and Asad Naqvi
Gravitational radiation from rotational core collapse: Effects of magnetic fields and realistic equations of state *(11 pages)* 124004
Kei Kotake, Shoichi Yamada, Katsuhiko Sato, Kohsuke Sumiyoshi, Hiroyuki Ono, and Hideyuki Suzuki
Boundary value problem for five-dimensional stationary rotating black holes *(7 pages)* 124005
Yoshiyuki Morisawa and Daisuke Ida
Nonlinear spinor field in cosmology *(13 pages)* 124006
Bijan Saha
Dimensional regularization of the third post-Newtonian dynamics of point particles in harmonic coordinates *(51 pages)* 124007
Luc Blanchet, Thibault Damour, and Gilles Esposito-Farèse
Spacetime foam model of the Schwarzschild horizon *(12 pages)* 124008
Jarmo Mäkelä and Ari Peltola
Late time analysis for maximal slicing of Reissner-Nordström puncture evolutions *(22 pages)* 124009
Bernd Reimann and Bernd Brügmann
Bianchi type-I cosmology with scalar and spinor fields *(12 pages)* 124010
Bijan Saha and Todor Boyadjiev
Gravitational energy loss in high energy particle collisions: Ultrarelativistic plunge into a multidimensional black hole *(13 pages)* 124011
Emanuele Berti, Marco Cavaglià, and Leonardo Gualtieri
Solution of the Dirac equation in the near horizon geometry of an extreme Kerr black hole *(7 pages)* 124012
I. Sakalli and M. Halilsoy
Circular orbit approximation for binary compact objects in general relativity *(12 pages)* 124013
Mark Miller
Fields with finite information density *(15 pages)* 124014
Achim Kempf
Probing Newton's constant on vast scales: Dvali-Gabadadze-Porrati gravity, cosmic acceleration, and large scale structure *(10 pages)* 124015
Arthur Lue, Román Scoccimarro, and Glenn D. Starkman
Charged black holes in quadratic gravity *(10 pages)* 124016
Jerzy Matyjasek and Dariusz Tryniecki
Numerical simulation of a possible counterexample to cosmic censorship *(4 pages)* 124017
David Garfinkle
Highly damped quasinormal modes of Kerr black holes: A complete numerical investigation *(5 pages)* 124018
Emanuele Berti, Vitor Cardoso, and Shijun Yoshida
The information paradox and the locality bound *(9 pages)* 124019
Steven B. Giddings and Matthew Lippert
Einstein boundary conditions in relation to constraint propagation for the initial-boundary value problem of the Einstein equations *(10 pages)* 124020
Simonetta Frittelli and Roberto Gómez

(Continued)

PHYSICAL REVIEW D **THIRD SERIES, VOLUME 69, NUMBER 12** **D15 JUNE 2004**

Nonsingular colliding wave solutions in Einstein-Maxwell-dilaton-axion theory *(6 pages)* 124021
E. Halilsoy and M. Halilsoy
Towards a formalism for mapping the spacetimes of massive compact objects: Bumpy black holes and their orbits *(16 pages)* 124022
Nathan A. Collins and Scott A. Hughes
Time travel paradoxes, path integrals, and the many worlds interpretation of quantum mechanics *(14 pages)* 124023
Allen Everett
Stationary circularly symmetric 2+1 rigidly rotating perfect fluids *(5 pages)* 124024
Alberto A. García
Controlling the growth of constraints in hyperbolic evolution systems *(14 pages)* 124025
Lee Lindblom, Mark A. Scheel, Lawrence E. Kidder, Harald P. Pfeiffer, Deirdre Shoemaker, and Saul A. Teukolsky
Quotients of $AdS_{p+1}\times S^q$: Causally well-behaved spaces and black holes *(29 pages)* 124026
José Figueroa-O'Farrill, Owen Madden, Simon F. Ross, and Joan Simón
Perfect fluid models in noncomoving observational spherical coordinates *(8 pages)* 124027
Mustapha Ishak
Accretion-driven gravitational radiation from nonrotating compact objects: Infalling quadrupolar shells *(21 pages)* 124028
Alessandro Nagar, Guillermo Díaz, José A. Pons, and José A. Font
Skeleton approximate solution of the Einstein field equations for multiple black-hole systems *(15 pages)* 124029
Guillaume Faye, Piotr Jaranowski, and Gerhard Schäfer
Dynamical evolution of a cylindrical shell with rotational pressure *(16 pages)* 124030
Masafumi Seriu
Reflection, radiation, and interference near the black hole horizon *(10 pages)* 124031
M. Yu. Kuchiev
Softly massive gravity *(15 pages)* 124032
G. Gabadadze and M. Shifman
Evolution of the Schrödinger-Newton system for a self-gravitating scalar field *(18 pages)* 124033
F. Siddhartha Guzmán and L. Arturo Ureña-López
Static black holes with a negative cosmological constant: Deformed horizon and anti–de Sitter boundaries *(14 pages)* 124034
Hirotaka Yoshino, Tohru Ohba, and Akira Tomimatsu
Harmonic map analysis of $SU(N)$ gravitating Skyrmions *(7 pages)* 124035
Yves Brihaye, Betti Hartmann, Theodora Ioannidou, and Wojtek Zakrzewski
Mergers of irrotational neutron star binaries in conformally flat gravity *(26 pages)* 124036
Joshua A. Faber, Philippe Grandclément, and Frederic A. Rasio
Remarks on BPS bound state "decay" *(8 pages)* 125001
Anatoly Dymarsky and Dmitry Melnikov
Symplectic structure for elastic and chiral conducting cosmic string models *(9 pages)* 125002
B. Carter and D. A. Steer
Decomposition of the meron configuration of an $SU(2)$ gauge field *(8 pages)* 125003
Minoru Hirayama and Jun Yamashita
Effective Lagrangians for orientifold theories *(9 pages)* 125004
F. Sannino and M. Shifman
Equivalence of light-front and conventional thermal field theory *(7 pages)* 125005
A. N. Kvinikhidze and B. Blankleider
QCD perturbation theory at large orders with large renormalization scales in the large β_0 limit *(10 pages)* 125006
Karel Van Acoleyen and Henri Verschelde

(Continued)

PHYSICAL REVIEW D **THIRD SERIES, VOLUME 69, NUMBER 12** **D15 JUNE 2004**

Noncommutative quantum mechanics and the Seiberg-Witten map *(6 pages)* 125007
Akira Kokado, Takashi Okamura, and Takesi Saito
Q stars in extra dimensions *(7 pages)* 125008
Athanasios Prikas
Failure of gauge invariance in the nonperturbative formulation of massless Lorentz-violating QED *(4 pages)* 125009
B. Altschul
Interacting particles and strings in path and surface representations *(13 pages)* 125010
P. J. Arias, E. Fuenmayor, and Lorenzo Leal
CERN Axion Solar Telescope as a probe of large extra dimensions *(5 pages)* 125011
R. Horvat, M. Krčmar, and B. Lakić
Oscillations and evolution of a hot and dense gas of flavor neutrinos: A quantum field theory study *(21 pages)* 125012
D. Boyanovsky and C. M. Ho
Correlations around an interface *(10 pages)* 125013
A. Bessa, C. A. A. de Carvalho, and E. S. Fraga
Dynamical gauge symmetry breaking and mass generation on the orbifold T^2/Z_2 *(17 pages)* 125014
Yutaka Hosotani, Shusaku Noda, and Kazunori Takenaga
Casimir effect between anti–de Sitter braneworlds *(10 pages)* 125015
James P. Norman
Universality in nontrivial continuum limits: A model calculation *(8 pages)* 125016
Y. Meurice and M. B. Oktay
Witten's ghost vertex made simple *(12 pages)* 126001
D. M. Belov
Multispin strings on $AdS_5 \times T^{1,1}$ and operators of $\mathcal{N}=1$ superconformal theory *(8 pages)* 126002
Nakwoo Kim
Gauge five-brane dynamics and small instanton transitions in heterotic models *(9 pages)* 126003
James Gray, André Lukas, and Gavin I. Probert
U(N) instantons on $\mathcal{N}=\frac{1}{2}$ superspace: Exact solution and geometry of moduli space *(20 pages)* 126004
Ruth Britto, Bo Feng, Oleg Lunin, and Soo-Jong Rey
Wrapped D-branes as BPS monopoles: The moduli space perspective *(15 pages)* 126005
Jessica K. Barrett and Clifford V. Johnson
Moduli potentials in string compactifications with fluxes: Mapping the discretuum *(14 pages)* 126006
R. Brustein and S. P. de Alwis
D matter *(10 pages)* 126007
Gary Shiu and Lian-Tao Wang
Nonsingular solutions for *s*-branes *(10 pages)* 126008
Gregory Jones, Alexander Maloney, and Andrew Strominger

BRIEF REPORTS

Nonlinear electrodynamics and the acceleration of the Universe *(4 pages)* 127301
M. Novello, S. E. Perez Bergliaffa, and J. Salim
Cosmic gravitational-wave background in a cyclic universe *(4 pages)* 127302
Latham A. Boyle, Paul J. Steinhardt, and Neil Turok
Addendum to "Superimposed oscillations in the WMAP data?" *(4 pages)* 127303
Jérôme Martin and Christophe Ringeval
Interior perfect fluid scalar-tensor solution *(4 pages)* 127501
Stoytcho S. Yazadjiev

(Continued)

PHYSICAL REVIEW D **THIRD SERIES, VOLUME 69, NUMBER 12** **D15 JUNE 2004**

Scalar-tensor gravity coupled to a global monopole and flat rotation curves *(4 pages)* 127502
Tae Hoon Lee and Byung Joo Lee
Monopole and Berry phase in momentum space in noncommutative quantum mechanics *(4 pages)* 127701
Alain Bérard and Hervé Mohrbach
Coordinate noncommutativity in strong nonuniform magnetic fields *(3 pages)* 127702
J. Frenkel and S. H. Pereira

COMMENTS

Cuts and penalties: Comment on ''Clustering of ultrahigh energy cosmic rays and their sources'' *(6 pages)* 128301
P. G. Tinyakov and I. I. Tkachev
Reply to ''Comment on 'Clustering of ultrahigh energy cosmic rays and their sources' '' *(2 pages)* 128302
N. W. Evans, F. Ferrer, and S. Sarkar
Consistent coupling to Dirac fields in teleparallelism: Comment on ''Metric-affine approach to teleparallel gravity'' *(3 pages)* 128501
Eckehard W. Mielke
Lessons of spin and torsion: Reply to ''Consistent coupling to Dirac fields in teleparallelism'' *(3 pages)* 128502
Yu. N. Obukhov and J. G. Pereira
Comment on ''Light-front Schwinger model at finite temperature'' *(4 pages)* 128701
B. Blankleider and A. N. Kvinikhidze
Reply to ''Comment on 'Light-front Schwinger model at finite temperature' '' *(3 pages)* 128702
Ashok Dos and Xingxiang Zhou

ERRATA

Publisher's Note: Dynamics of M-theory vacua [Phys. Rev. D **69**, 106012 (2004)] *(1 page)* . . . . . 129901(E)
John F. Donoghue
Erratum: Effects of the sound speed of quintessence on the microwave background and large scale structure [Phys. Rev. D **67**, 103509 (2003)] *(1 page)* . . . . . 129902(E)
Simon DeDeo, R. R. Caldwell, and Paul J. Steinhardt
Erratum: Radiation reaction in quantum field theory [Phys. Rev. D **66**, 105004 (2002)] *(2 pages)* . . . . . 129903(E)
Atsushi Higuchi

Cumulative Author Index i