

# CURRICULUM VITAE OF ROBERT J. SCHERRER

## Address:

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## Education

Sept. 1977 - June 1981: Princeton University, A.B. in physics, magna cum laude  
Sept. 1981 - Aug. 1983: Cambridge University, M.A. in physics.  
Sept. 1983 - Oct. 1986: University of Chicago, Ph.D. in physics (Thesis advisor: Prof. Michael S. Turner).

## Positions Held

Oct. 1986 - Jun. 1987, Oct. 1987 - Jul. 1988: Harvard University, Postdoctoral Research Associate.  
Jun. 1987 - Oct. 1987, Jul. 1988 - Dec. 1988: Queen Mary College, University of London, NATO Postdoctoral Fellow.  
Jan. 1989 - Sept. 1993: Assistant Professor, Department of Physics, The Ohio State University.  
Oct. 1993 - Sept. 1998: Associate Professor, Department of Physics, The Ohio State University.  
Oct. 1996 - Sept. 1998: Associate Professor, Department of Astronomy, The Ohio State University.  
Sept. 1997 - May 1998: Visiting Scientist, Theoretical Astrophysics Group, Fermilab  
Oct. 1998 - Aug. 2003: Professor, Department of Physics and Department of Astronomy, The Ohio State University.  
Oct. 1999 - Aug. 2003: Vice-Chair for Undergraduate Studies, Department of Physics, The Ohio State University  
Jan. 2004 - Jul. 2017: Chair, Department of Physics and Astronomy, Vanderbilt University  
Sept. 2003 - present: Professor, Department of Physics and Astronomy, Vanderbilt University.  
Aug. 2018 - present: Professor, Program in the Communication of Science and Technology, Vanderbilt University.

## Honors and Awards

Marshall Scholarship (1981-83).  
McCormick Graduate Fellowship (University of Chicago 1983-86).  
NATO Postdoctoral Fellowship (1987-88).  
The Ohio State University Alumni Award for Distinguished Teaching (1999).  
Fellow of the American Physical Society (2001).  
5th Prize, Gravity Research Foundation Essay Competition (2007).  
Klopsteg Memorial Award, American Association of Physics Teachers (2010).

## Books

*Quantum Mechanics: An Accessible Introduction*

Robert J. Scherrer

San Francisco: Addison-Wesley (2005).

*Instructor Solutions Manual for Quantum Mechanics: An Accessible Introduction*

Robert J. Scherrer

San Francisco: Addison-Wesley (2006).

## Refereed Publications

- 1] Massive neutrinos and primordial nucleosynthesis  
Edward W. Kolb and Robert J. Scherrer  
Physical Review D, **25**, 1481 (1982).
- 2] Primordial element production in universes with large lepton-baryon ratio  
Robert J. Scherrer  
Monthly Notices of the Royal Astronomical Society, **205**, 683 (1983).
- 3] Deuterium and helium-3 production from massive neutrino decay  
Robert J. Scherrer  
Monthly Notices of the Royal Astronomical Society, **210**, 359 (1984).
- 4] Decaying particles do not “heat up” the Universe  
Robert J. Scherrer and Michael S. Turner  
Physical Review D, **31**, 681 (1985).
- 5] On the relic cosmic abundance of stable, weakly-interacting massive particles  
Robert J. Scherrer and Michael S. Turner  
Physical Review D, **33**, 1585 (1986).
- 6] Cosmic strings as random walks  
Robert J. Scherrer and Joshua A. Frieman  
Physical Review D, **33**, 3556 (1986).
- 7] Cosmological baryon diffusion and nucleosynthesis  
James H. Applegate, Craig J. Hogan, and Robert J. Scherrer  
Physical Review D, **35**, 1151 (1987).
- 8] The formation of large-scale structure from cosmic string loops and cold dark matter  
Adrian L. Melott and Robert J. Scherrer  
Nature **328**, 691 (1987).
- 9] Large-scale structure from cosmic string loops. I. Formation and linear evolution of perturbations  
Robert J. Scherrer  
The Astrophysical Journal **320**, 1 (1987)
- 10] Cosmological quantum chromodynamics, neutron diffusion, and the production of primordial heavy elements  
James H. Applegate, Craig J. Hogan, and Robert J. Scherrer  
The Astrophysical Journal, **329**, 572 (1988).

- 11] Primordial nucleosynthesis with decaying particles. I. Entropy-producing decays  
Robert J. Scherrer and Michael S. Turner  
The Astrophysical Journal, **331**, 19 (1988).
- 12] Primordial nucleosynthesis with decaying particles. II. Inert decays  
Robert J. Scherrer and Michael S. Turner  
The Astrophysical Journal, **331**, 33 (1988).
- 13] Large-scale structure from cosmic string loops in a baryon-dominated universe  
Adrian L. Melott and Robert J. Scherrer  
The Astrophysical Journal, **331**, 38 (1988).
- 14] Self-excited cosmic string dynamo  
David N. Spergel, William H. Press, and Robert J. Scherrer  
Nature, **334**, 682 (1988).
- 15] Cosmic string loop fragmentation  
Robert J. Scherrer and William H. Press  
Physical Review D, **39**, 371 (1989).
- 16] Electromagnetic self-interaction of superconducting cosmic strings  
David N. Spergel, William H. Press, and Robert J. Scherrer  
Physical Review D, **39**, 379 (1989).
- 17] The formation of large-scale structure from cosmic strings and massive neutrinos  
Robert J. Scherrer, Adrian L. Melott, and Edmund Bertschinger  
Physical Review Letters, **62**, 379 (1989).
- 18] Void statistics, scaling, and the origins of large-scale structure  
J.N. Fry, Riccardo Giovanelli, Martha P. Haynes, Adrian L. Melott, and Robert J. Scherrer  
The Astrophysical Journal, **340**, 11 (1989).
- 19] The area of isodensity contours in cosmological models and galaxy surveys  
Barbara S. Ryden, Adrian L. Melott, David A. Craig, J. Richard Gott III, David H. Weinberg, Robert J. Scherrer, Suketu P. Bhavsar, John M. Miller  
The Astrophysical Journal, **340**, 647 (1989).
- 20] Properties of realistic cosmic string loops  
Robert J. Scherrer, Jean M. Quashnock, David N. Spergel, and William H. Press  
Physical Review D, **42**, 1908 (1990).
- 21] The formation of pregalactic objects from white-noise density perturbations  
Robert J. Scherrer and Tanmay Vachaspati  
The Astrophysical Journal, **361**, 338 (1990).
- 22] Seeded hot dark matter models for large-scale structure  
Jens V. Villumsen, Robert J. Scherrer, and E. Bertschinger  
The Astrophysical Journal, **367**, 37 (1991).
- 23] Comparison of likely candidate models for Abell cluster structures against the observed distribution  
David J. Batuski, Adrian L. Melott, Robert J. Scherrer, and Edmund Bertschinger  
The Astrophysical Journal, **367**, 393 (1991).

- 24] Indirect photofission of light elements from high-energy neutrinos in the early universe  
John Gratsias, Robert J. Scherrer, and David N. Spergel  
Physics Letters B, **262**, 298 (1991).
- 25] A quantitative measure of phase correlations in density fields  
Robert J. Scherrer, Adrian L. Melott, and Sergei F. Shandarin  
The Astrophysical Journal, **377**, 29 (1991).
- 26] Statistics of primordial density perturbations from discrete seed masses  
Robert J. Scherrer and Edmund Bertschinger  
The Astrophysical Journal, **381**, 349 (1991).
- 27] Gravitino-induced baryogenesis, primordial nucleosynthesis, and the Tremaine-Gunn limit  
Robert J. Scherrer, James Cline, Stuart Raby, and D. Seckel  
Physical Review D, **44**, 3760 (1991).
- 28] Cosmological explosions from cold dark matter perturbations  
Robert J. Scherrer  
The Astrophysical Journal, **384**, 391 (1992).
- 29] Topology of large-scale structure in seeded hot dark matter models  
Matthew M. Beaky, Robert J. Scherrer, and Jens V. Villumsen  
The Astrophysical Journal, **387**, 443 (1992).
- 30] Linear velocity fields in non-Gaussian models for large-scale structure  
Robert J. Scherrer  
The Astrophysical Journal, **390**, 330 (1992).
- 31] Seeded hot dark matter models with inflation  
John Gratsias, Robert J. Scherrer, Gary Steigman, and Jens V. Villumsen  
The Astrophysical Journal, **405**, 30 (1993).
- 32] How constant is the Fermi coupling constant?  
Robert J. Scherrer and David N. Spergel  
Physical Review D, **47**, 4774 (1993).
- 33] Improved cosmological constraints on neutrino-producing decaying particles  
Andrew A. de Laix and Robert J. Scherrer  
Physical Review D, **48**, 562 (1993).
- 34] Linear evolution of the gravitational potential: a new approximation for the nonlinear evolution of large-scale structure  
Tereasa G. Brainerd, Robert J. Scherrer, and Jens V. Villumsen  
The Astrophysical Journal, **418**, 570 (1993).
- 35] Big bang nucleosynthesis constraints on the tau neutrino mass  
Masahiro Kawasaki, Pete Kernan, Ho-Shik Kang, Robert J. Scherrer, Gary Steigman, and Terry P. Walker  
Nuclear Physics B, **419**, 105 (1994).
- 36] Skewness in large-scale structure and non-Gaussian initial conditions  
J.N. Fry and Robert J. Scherrer  
The Astrophysical Journal, **429**, 36 (1994).

- 37] Velocity differences as a probe of non-Gaussian density fields  
Paolo Catelan and Robert J. Scherrer  
The Astrophysical Journal, **445**, 1 (1995).
- 38] When can non-Gaussian density fields produce a Gaussian Sachs-Wolfe effect?  
Robert J. Scherrer and Robert K. Schaefer  
The Astrophysical Journal, **446**, 44 (1995).
- 39] Constraints on self-interacting dark matter  
Andrew A. de Laix, Robert J. Scherrer, and Robert K. Schaefer  
The Astrophysical Journal, **452**, 495 (1995).
- 40] Big Bang nucleosynthesis in crisis?  
N. Hata, Robert J. Scherrer, G. Steigman, D. Thomas, T.P. Walker, S. Bludman, and P. Langacker  
Physical Review Letters, **75**, 3977 (1995).
- 41] Predicting Big Bang deuterium  
N. Hata, Robert J. Scherrer, G. Steigman, D. Thomas, and T.P. Walker  
The Astrophysical Journal, **458**, 637 (1996).
- 42] A linear programming approach to inhomogeneous primordial nucleosynthesis  
Richard E. Leonard and Robert J. Scherrer  
The Astrophysical Journal, **463**, 420 (1996).
- 43] Another look at Gaussian isocurvature hot dark matter models for large-scale structure  
Andrew A. de Laix and Robert J. Scherrer  
The Astrophysical Journal, **464**, 539 (1996).
- 44] Local Lagrangian approximations for the evolution of the density distribution function in large-scale structure  
Zacharias A.M. Protogeris and Robert J. Scherrer  
Monthly Notices of the Royal Astronomical Society, **284**, 425 (1997).
- 45] Skewness of the large-scale velocity divergence from non-Gaussian initial conditions  
Zacharias A.M. Protogeris and Robert J. Scherrer  
Monthly Notices of the Royal Astronomical Society, **286**, 223 (1997).
- 46] Testing tree-level perturbation theory for large-scale structure with the Local Lagrangian Approximation  
Zacharias A.M. Protogeris, Adrian L. Melott, and Robert J. Scherrer  
Monthly Notices of the Royal Astronomical Society, **290**, 367 (1997).
- 47] Cosmic string formation from correlated fields  
Robert J. Scherrer and Alexander Vilenkin  
Physical Review D, **56**, 647 (1997).
- 48] Constraints on the effects of locally-biased galaxy formation  
Robert J. Scherrer and David H. Weinberg  
The Astrophysical Journal, **504**, 607 (1998).
- 49] Probing unstable massive neutrinos with current cosmic microwave background observations  
Robert E. Lopez, Scott Dodelson, Robert J. Scherrer, and Michael S. Turner  
Physical Review Letters, **81**, 3075 (1998).

- 50] Lattice effects in simulations of topological defect formation  
Robert J. Scherrer and Alexander Vilenkin  
Physical Review D, **58**, 103501 (1998).
- 51] A classification of scalar field potentials with cosmological scaling solutions  
Andrew R. Liddle and Robert J. Scherrer  
Physical Review D, **59**, 023509 (1999).
- 52] Constraining variations in the fine-structure constant with the cosmic microwave background  
Manoj Kaplinghat, Robert J. Scherrer, and Michael S. Turner  
Physical Review D, **60**, 023516 (1999).
- 53] Improved treatment of cosmic microwave background fluctuations induced by a late-decaying massive neutrino  
Manoj Kaplinghat, Robert E. Lopez, Scott Dodelson, and Robert J. Scherrer  
Physical Review D, **60**, 123508 (1999).
- 54] Inhomogeneous neutrino degeneracy and Big Bang nucleosynthesis  
Scott E. Whitmire and Robert J. Scherrer  
Physical Review D, **61**, 083508 (2000).
- 55] The effect of time variation in the Higgs vacuum expectation value on the cosmic microwave background  
Jens Kujat and Robert J. Scherrer  
Physical Review D, **62**, 023510 (2000).
- 56] Self-interacting warm dark matter  
Steen Hannestad and Robert J. Scherrer  
Physical Review D, **62**, 043522 (2000).
- 57] Cosmic microwave background constraint on residual annihilations of relic particles  
Patrick McDonald, Robert J. Scherrer, and Terry P. Walker  
Physical Review D, **63**, 023001 (2001).
- 58] Recent CMB observations and the ionization history of the universe  
Steen Hannestad and Robert J. Scherrer  
Physical Review D, **63**, 083001 (2001).
- 59] Extended quintessence and the primordial helium abundance  
Xuelei Chen, Robert J. Scherrer, and Gary Steigman  
Physical Review D, **63**, 123504 (2001).
- 60] How does CMB + BBN constrain new physics?  
James P. Kneller, Robert J. Scherrer, Gary Steigman, and Terry P. Walker  
Physical Review D, **64**, 123506 (2001).
- 61] The real and redshift space density distribution function for large-scale structure in the spherical collapse approximation  
Robert J. Scherrer and Enrique Gaztañaga  
Monthly Notices of the Royal Astronomical Society, **328**, 257 (2001)
- 62] Prospects for determining the equation of state of the dark energy: what can be learned from multiple observables?  
Jens Kujat, Angela M. Linn, Robert J. Scherrer, and David H. Weinberg  
The Astrophysical Journal, **572**, 1 (2002).

- 63] Cosmic microwave background and large scale structure limits on the interaction between dark matter and baryons  
Xuelei Chen, Steen Hannestad, and Robert J. Scherrer  
Physical Review D, **65**, 123515 (2002).
- 64] Big Bang nucleosynthesis with Gaussian inhomogeneous neutrino degeneracy  
Spencer D. Stirling and Robert J. Scherrer  
Physical Review D, **66**, 043531 (2002).
- 65] Big Bang nucleosynthesis constraints on brane cosmologies  
Jonathan D. Bratt, A.C. Gault, Robert J. Scherrer, and T.P. Walker  
Physics Letters B, **546**, 19 (2002).
- 66] Big Bang nucleosynthesis and cosmic microwave background constraints on the time variation of the Higgs vacuum expectation value  
Jerry Jaiyul Yoo and Robert J. Scherrer  
Physical Review D, **67**, 043517 (2003).
- 67] Evolution of Inverse Power Law Quintessence at Low Redshift  
Casey R. Watson and Robert J. Scherrer  
Physical Review D, **68**, 123524 (2003).
- 68] The Uncertainty in Newton's Constant and Precision Predictions of the Primordial Helium Abundance  
Robert J. Scherrer  
Physical Review D, **69**, 107302 (2004).
- 69] Purely kinetic k-essence as unified dark matter  
Robert J. Scherrer  
Physical Review Letters, **93**, 011301 (2004).
- 70] Do Fermions and Bosons Produce the Same Gravitational Field?  
John D. Barrow and Robert J. Scherrer  
Physical Review D, **70**, 103515 (2004).
- 71] Phantom dark energy, cosmic doomsday, and the coincidence problem  
Robert J. Scherrer  
Physical Review D, **71**, 063519 (2005).
- 72] Constraints on the variation of G from primordial nucleosynthesis  
Timothy Clifton, John D. Barrow, and Robert J. Scherrer  
Physical Review D, **71**, 123526 (2005).
- 73] Generalizing the generalized Chaplygin gas  
A.A. Sen and Robert J. Scherrer  
Physical Review D, **72**, 063511 (2005).
- 74] Dark energy models in the  $w - w'$  plane  
Robert J. Scherrer  
Physical Review D, **73**, 043502 (2006).
- 75] Classical cancellation of the cosmological constant re-considered  
S.M. Barr, S.-P. Ng, and Robert J. Scherrer  
Physical Review D, **73**, 063530 (2006).

- 76] Phantom dark energy models with negative kinetic term  
Jens Kujat, Robert J. Scherrer, and A.A. Sen  
Physical Review D, **74**, 083501 (2006).
- 77] Tracking quintessence and k-essence in a general cosmological background  
Rupam Das, Thomas W. Kephart, and Robert J. Scherrer  
Physical Review D, **74**, 103515 (2006).
- 78] Radiation can never again dominate matter in a vacuum dominated universe  
Lawrence M. Krauss and Robert J. Scherrer  
Physical Review D, **75**, 083524 (2007).
- 79] The return of a static universe and the end of cosmology  
Lawrence M. Krauss and Robert J. Scherrer  
Journal of Gravitation and General Relativity, **39**, 1545 (2007).
- 80] The weak energy condition and the expansion history of the universe  
A.A. Sen and Robert J. Scherrer  
Physics Letters B, **659**, 457 (2008).
- 81] Thawing quintessence with a nearly flat potential  
Robert J. Scherrer and A.A. Sen  
Physical Review D, **77**, 083515 (2008).
- 82] Dirac fields in loop quantum gravity and Big Bang nucleosynthesis  
Martin Bojowald, Rupam Das, and Robert J. Scherrer  
Physical Review D, **77**, 084003 (2008).
- 83] Toward a minimum branching fraction for dark matter annihilation into electromagnetic final states  
James B. Dent, Robert J. Scherrer, and Thomas J. Weiler  
Physical Review D, **78**, 063509 (2008).
- 84] Phantom dark energy models with a nearly flat potential  
Robert J. Scherrer and A.A. Sen  
Physical Review D, **78**, 067303 (2008).
- 85] Evolution of oscillating scalar fields as dark energy  
Sourish Dutta and Robert J. Scherrer  
Physical Review D, **78**, 083512 (2008).
- 86] Hilltop quintessence  
Sourish Dutta and Robert J. Scherrer  
Physical Review D, **78**, 123525 (2008).
- 87] Dark energy from a phantom field near a local potential minimum  
Sourish Dutta and Robert J. Scherrer  
Physics Letters B, **676**, 12 (2009).
- 88] Dark radiation as a signature of dark energy  
Sourish Dutta, Stephen D.H. Hsu, David Reeb, and Robert J. Scherrer  
Physical Review D, **79**, 103504 (2009).
- 89] Dark energy from a quintessence (phantom) field rolling near potential minimum (maximum)  
Sourish Dutta, Emmanuel N. Saridakis, and Robert J. Scherrer  
Physical Review D, **79**, 103005 (2009).



- 90] Aetherizing lambda: Barotropic fluids as dark energy  
Eric V. Linder and Robert J. Scherrer  
Physical Review D, **80**, 023008 (2009).
- 91] Slow-roll k-essence  
Takeshi Chiba, Sourish Dutta, and Robert J. Scherrer  
Physical Review D, **80**, 043517 (2009).
- 92] From finance to cosmology: the copula of large-scale structure  
Robert J. Scherrer, Andreas A. Berlind, Qingqing Mao, and Cameron K. McBride  
Astrophysical Journal Letters, **708**, L9 (2010).
- 93] Thermal relic abundances of particles with velocity-dependent interactions  
James B. Dent, Sourish Dutta, and Robert J. Scherrer  
Physics Letters B, **687**, 275 (2010)
- 94] Decaying dark matter mimicking time-varying dark energy  
Sourish Dutta and Robert J. Scherrer  
Physical Review D, **82**, 043526 (2010).
- 95] Big Bang nucleosynthesis with a stiff fluid  
Sourish Dutta and Robert J. Scherrer  
Physical Review D, **82**, 083501 (2010).
- 96] Slow-roll freezing quintessence  
Sourish Dutta and Robert J. Scherrer  
Physics Letters B, **704**, 265 (2011).
- 97] The little rip  
Paul H. Frampton, Kevin J. Ludwick, and Robert J. Scherrer  
Physical Review D, **84**, 063003 (2011).
- 98] Models for little rip dark energy  
Paul H. Frampton, Kevin J. Ludwick, Shin'ichi Nojiri, Sergei D. Odintsov, and Robert J. Scherrer  
Physics Letters B, **708**, 204 (2012).
- 99] Dark Radiation from particle decays during big bang nucleosynthesis  
Justin L. Menestrina and Robert J. Scherrer  
Physical Review D, **85**, 047301 (2012).
- 100] The pseudo-rip: Cosmological models intermediate between the cosmological constant and the little rip  
Paul H. Frampton, Kevin J. Ludwick, and Robert J. Scherrer  
Physical Review D, **85**, 083001 (2012).
- 101] Scalar dark energy models mimicking  $\Lambda$ CDM with arbitrary future evolution  
Artyom V. Astashenok, Shin'ichi Nojiri, Sergei D. Odintsov, and Robert J. Scherrer  
Physics Letters B, **713**, 145 (2012).
- 102] Coincidence problem in cyclic phantom models of the universe  
Hui-Yiing Chang and Robert J. Scherrer  
Physical Review D, **86**, 027303 (2012).
- 103] Limits on MeV dark matter from the effective number of neutrinos  
Chiu Man Ho and Robert J. Scherrer  
Physical Review D, **87**, 023505 (2013).

- 104] Anapole dark matter  
Chiu Man Ho and Robert J. Scherrer  
Physics Letters B, **722**, 341 (2013).
- 105] Sterile neutrinos and light dark matter save each other  
Chiu Man Ho and Robert J. Scherrer  
Physical Review D, **87**, 065016 (2013).
- 106] Inflection point quintessence  
Hui-Yiing Chang and Robert J. Scherrer  
Physical Review D, **88**, 083003 (2013).
- 107] Anapole dark matter at the LHC  
Yu Gao, Chiu Man Ho, and Robert J. Scherrer  
Physical Review D, **89**, 045006 (2014).
- 108] Constraining primordial non-Gaussianity with moments of the large scale density field  
Qingqing Mao, Andreas A. Berlind, Cameron K. McBride, Robert J. Scherrer, Roman Scoccimarro, and Marc Manera  
Monthly Notices of the Royal Astronomical Society, **443**, 1402 (2014).
- 109] A new approach to cosmological bulk viscosity  
Marcelo M. Disconzi, Thomas W. Kephart, and Robert J. Scherrer  
Physical Review D, **91**, 043532 (2015).
- 110] The quadratic approximation for quintessence with arbitrary initial conditions  
Jeffrey R. Swaney and Robert J. Scherrer  
Physical Review D, **91**, 123525 (2015).
- 111] Cosmological particle decays at finite temperature  
Chiu Man Ho and Robert J. Scherrer  
Physical Review D, **92**, 025019 (2015).
- 112] Mapping the Chevallier-Polarski-Linder parametrization onto physical dark energy models  
Robert J. Scherrer  
Physical Review D, **92**, 043001 (2015).
- 113] Oscillating and static universes from a single barotropic fluid  
John Kehayias and Robert J. Scherrer  
Journal of Cosmology and Astroparticle Physics, **12**, 015 (2015).
- 114] Classifying the behavior of noncanonical quintessence  
Dan Li and Robert J. Scherrer  
Physical Review D, **93**, 083509 (2016).
- 115] Cogenerating and pre-annihilating dark matter by a new gauge interaction  
S.M. Barr and Robert J. Scherrer  
Journal of Cosmology and Astroparticle Physics, **05**, 065 (2016).
- 116] Cosmic voids in the SDSS DR12 BOSS galaxy sample: the Alcock-Paczynski test  
Qinqing Mao, Andreas A. Berlind, Robert J. Scherrer, Mark C. Neyrinck, Roman Scoccimarro, Jeremy L. Tinker, and Cameron K. McBride  
Astrophysical Journal, **835**, 160 (2017).

- 117] A cosmic void catalog of SDSS DR12 BOSS galaxies  
Qingqing Mao, et al.  
Astrophysical Journal, **835**, 161 (2017).
- 118] Cosmology with independently varying neutrino temperature and number  
Richard Galvez and Robert J. Scherrer  
Physical Review D, **95**, 063507 (2017).
- 119] On a viable first order formulation of relativistic viscous fluids and its applications to cosmology  
Marcelo M. Disconzi, Thomas W. Kephart, and Robert J. Scherrer  
International Journal of Modern Physics D, **26**, 1750146 (2017).
- 120] Big bang nucleosynthesis with stable  $^8\text{Be}$  and the primordial lithium problem  
Richard T. Scherrer and Robert J. Scherrer  
Physical Review D, **96**, 083507 (2017).
- 121] Oscillating scalar fields in extended quintessence  
Dan Li, Shi Pi, and Robert J. Scherrer  
Physical Review D, **97**, 023530 (2018).
- 122] Dark energy with  $w \rightarrow -1$ : Asymptotic  $\Lambda$  versus pseudo- $\Lambda$   
Robert J. Scherrer  
Physical Review D, **97**, 123521 (2018).
- 123] Constraining density fluctuations with big bang nucleosynthesis in the era of precision cosmology  
John D. Barrow and Robert J. Scherrer  
Physical Review D, **98**, 043534 (2018).
- 124] The relation between transverse and radial velocity distributions for observations of an isotropic velocity field  
Robert J. Scherrer and Abraham Loeb  
Monthly Notices of the Royal Astronomical Society Letters, **483**, L132 (2019).
- 125] New generic evolution for  $k$ -essence dark energy with  $w \approx -1$   
John Kehayias and Robert J. Scherrer  
Physical Review D, **100**, 023525 (2019).
- 126] Diffusion-limited relic particle production  
Robert J. Scherrer and Michael S. Turner  
Physical Review D, **100**, 043545 (2019).
- 127] The coincidence problem and the Swampland conjectures in the Ijjas-Steinhardt cyclic model of the universe  
Robert J. Scherrer  
Physics Letters B, **798**, 134981 (2019).
- 128] Death and serious injury from dark matter  
Jagjit Singh Sidhu, Robert Scherrer, and Glenn Starkman  
Physics Letters B, **803**, 135300 (2020).
- 129] Antimatter as macroscopic dark matter  
Jagjit Singh Sidhu, Robert J. Scherrer, and G. Starkman  
Physics Letters B, **807**, 135574 (2020).

- 130] Swampland conjectures and slow-roll thawing quintessence  
S. David Storm and Robert J. Scherrer  
Physical Review D, **102**, 063519 (2020).
- 131] Is the universal matter-antimatter asymmetry fine-tuned?  
Gary Steigman and Robert J. Scherrer  
in *Fine-Tuning in the Physical Universe*  
Eds. D. Sloan, et al., Cambridge University Press (2020).
- 132] Cosmological evolution of ultralight axionlike scalar fields  
Cameron E. Norton and Robert J. Scherrer  
Physical Review D, **103**, 023515 (2021).
- 133] Does inhomogeneous big bang nucleosynthesis produce an inhomogeneous element distribution today?  
Robert J. Scherrer  
Physical Review D, **103**, 123548 (2021).
- 134] Evolution of decaying particles and decay products in various scenarios for the future expansion of the universe  
Cameron E. Norton and Robert J. Scherrer  
Physical Review D, **104**, 123506 (2021).
- 135] Observational constraints on inflection point quintessence with a cubic potential  
S. David Storm and Robert J. Scherrer  
Physics Letters B, **829**, 137126 (2022).
- 136] Exact general solutions for cosmological scalar field evolution in a background-dominated expansion  
Robert J. Scherrer  
Physical Review D, **105**, 103502 (2022).
- 137] Ultra long-term cosmology and astrophysics  
Robert J. Scherrer and Abraham Loeb  
New Astronomy, in press.
- 138] How slowly can the early universe expand?  
Robert J. Scherrer  
Physical Review Letters, submitted.

## Non-refereed Publications

- 1] Resurrecting hot dark matter: Large-scale structure from cosmic strings and massive neutrinos  
Robert J. Scherrer  
Publications of the Astronomical Society of the Pacific, **100**, 1364 (1988)
- 2] A numerical simulation of loop fragmentation  
Robert J. Scherrer  
In “Cosmic Strings: The Current Status, Proceedings of the Yale Cosmic String Workshop”  
Eds. Frank S. Accetta and Lawrence M. Krauss  
Yale University Press (1988).
- 3] Cosmic string angular momentum  
Robert J. Scherrer  
In “The Formation and Evolution of Cosmic Strings”  
Eds. G.W. Gibbons, S.W. Hawking, and T. Vachaspati  
Cambridge University Press (1990).
- 4] Reviving massive neutrinos for large-scale structure  
Robert J. Scherrer  
In “Primordial Nucleosynthesis and Evolution of Early Universe”  
Eds. K. Sato and J. Audouze  
Kluwer (1991).
- 5] Large-scale velocity fields in non-Gaussian seeded models  
Paolo Catelan and Robert J. Scherrer  
In “Cosmic Velocity Fields”  
Eds. F.R. Bouchet and M. Lachieze-Rey  
Editions Frontieres (1993).
- 6] An introduction to large scale structure  
Robert J. Scherrer  
In “The Building Blocks of Creation: From Microfermis to Megaparsecs”  
Eds. S. Raby and T.P. Walker  
World Scientific (1994).
- 7] Differential neutrino heating and reduced  ${}^4\text{He}$  production from decaying particles in the early universe  
Richard E. Leonard and Robert J. Scherrer  
astro-ph/9509134 (1995).
- 8] Big Bang nucleosynthesis: the emerging crisis  
G. Steigman, N. Hata, R.J. Scherrer, D. Thomas, and T.P. Walker  
In “Particles, Strings, and Cosmology”  
Eds. J. Bagger, G. Domokos, A. Falk, and S. Kovesi-Domokos  
World Scientific (1996).
- 9] Zeroing in on the Fundamental Parameters of Cosmology  
Robert J. Scherrer  
In “Proceedings of the 28th International Conference on High Energy Physics”  
Eds. Z. Ajduk and A.K. Wroblewski  
World Scientific (1997).

- 10] Primordial Nucleosynthesis  
Robert J. Scherrer  
In "Proceedings of the 1999 Gamov Memorial International Conference"  
Astronomy and Astrophysics Transactions, **19**, 367 (2000).
- 11] The Effect of Relic Particle Annihilations on the Cosmic Microwave Background  
Robert J. Scherrer  
In "Proceedings of DPF2000"  
International Journal of Modern Physics A, **16** (2001).
- 12] Constraints on Non-Standard Recombination from Recent CMB Observations  
Angela M. Linn and Robert J. Scherrer  
astro-ph/0404282 (2004).
- 13] The Return of a Static Universe and the End of Cosmology (reprint)  
Lawrence M. Krauss and Robert J. Scherrer  
International Journal of Modern Physics D, **17**, 685 (2008).
- 14] Dark energy, with signatures  
Sourish Dutta, Robert J. Scherrer, and S.D.H. Hsu  
International Journal of Modern Physics D, **19**, 2325 (2010).
- 15] Reviving quintessence with an exponential potential  
Hui-Yiing Chang and Robert J. Scherrer  
arXiv:1608.03291 (2016).

## Popular Articles

- 1] From the cradle of creation  
Robert J. Scherrer  
Astronomy, Feb. 1988.
- 2] The curtains at the edge of the universe  
Robert J. Scherrer and Sarah W. Scherrer  
Astronomy, Nov. 1995.
- 3] Op zoek naar de oerknal (in Dutch)  
Robert J. Scherrer  
Zenit (Netherlands), May 1996.
- 4] The end of cosmology?  
Lawrence M. Krauss and Robert J. Scherrer  
Scientific American, Mar. 2008.
- 5] Explainer: the mysterious dark energy that speeds the universe's rate of expansion  
Robert J. Scherrer  
The Conversation, Apr. 23, 2015.
- 6] Faster-than-light travel: are we there yet?  
Robert J. Scherrer  
The Conversation, May 8, 2015.
- 7] Intelligent life in the universe? Phone home, dammit!  
Robert J. Scherrer  
The Conversation, Jun. 15, 2015.
- 8] College Applications, Parental Exasperations  
Robert J. Scherrer  
The Wall Street Journal, Oct. 7, 2015.
- 8] How to Raise a Scientist in the Xbox Age  
Robert J. Scherrer  
The Wall Street Journal, Dec. 14, 2015.
- 9] The Professor and Mary Ann (and Your Children)  
Robert J. Scherrer  
National Review Online, Jan. 21, 2017.
- 10] Gary Steigman (Obituary)  
Robert J. Scherrer, John Beacom, Terry Walker, Keith Olive, and Michael S. Turner  
Physics Today, **70**, 72 (2017).
- 11] The Mindset List, Faculty Edition  
Robert J. Scherrer  
Inside Higher Ed, Aug. 22, 2017
- 12] Disciplined Daydreaming, the Role of Ideas in Science and Science Fiction  
Robert J. Scherrer  
Analog, March/April 2019

- 13] Science Fiction: The Cloudy Crystal Ball  
Robert J. Scherrer  
Scientific American: Observations, Apr. 2, 2019



## **Research Grants**

### **Ohio State University Office of Research and Graduate Studies**

Ohio State University Seed Grant (single investigator)  
\$14,500 (1989-90)

### **Department of Energy**

Ohio State University Task K (with Gary Steigman and Terry Walker)  
\$122,000 (1990-1991)  
\$146,000 (1991-1992)  
\$170,000 (1992-1993)  
\$163,000 (1993-1994)  
\$155,000 (1994-1995)  
\$190,000 (1995-1996)  
\$182,000 (1996-1997)  
\$185,000 (1997-1998)  
\$200,000 (1998-1999)  
\$225,000 (1999-2000)  
\$223,000 (2000-2001)  
\$213,000 (2001-2002)  
\$225,000 (2003)

Vanderbilt University (with Tom Weiler and Tom Kephart)  
\$192,000 (2004-2005)  
\$205,000 (2005-2006)  
\$196,000 (2006-2007)  
\$200,000 (2007-2008)  
\$225,000 (2008-2009)  
\$250,000 (2009-2010)  
\$260,000 (2010-2011)  
\$260,000 (2011-2012)  
\$260,000 (2012-2013)  
\$260,000 (2013-2014)  
\$190,000 (2014-2015).  
\$190,000 (2015-2016).

Vanderbilt University (single investigator)  
\$83,000 (2018-2022)

## **NASA**

Nonstandard Models for Large-scale Structure (single investigator)  
\$37,154 (1991-93)

Galactic and Large-Scale Structure (with Barbara Ryden and Andrew Gould)  
\$90,000 (1994-95)

Dark Matter and Cosmic Structure Formation (with David Weinberg, Barbara Ryden, and Andrew Gould)  
\$7000 (1995-96)  
\$100,000 (1996-97)  
\$100,000 (1997-98)

## **NSF**

The Ohio State University Summer Physics Institute (along with many others, but I was the PI and wrote the proposal)

\$215,219 (2003 - 2005)

## Seminars, Colloquia, Conference Talks (1989-present)

“An Introduction to Cosmic Strings,” colloquium, Case Western Reserve University, Mar. 1989.

“Large-scale structure from Cosmic Strings,” seminar, Case Western University, Mar. 1989.

“Cosmic String Angular Momentum,” talk at the Cambridge Workshop on the Formation and Evolution of Cosmic Strings, Cambridge, Jul. 1989.

“New Mechanisms for the Formation of Pregalactic Objects,” talk at the NATO Advanced Study Institute on Baryonic Dark Matter, Cambridge, Jul. 1989.

“Primordial Nucleosynthesis: Orthodoxy and Heresy,” colloquium, University of Kansas, Dec. 1989.

“Seeded Hot Dark Matter Models for Large-scale Structure,” seminar, Fermilab, Mar. 1990.

“Seeded Hot Dark Matter Models for Large-scale Structure,” talk at the Lawrence Workshop on the Legacy of Zel’dovich, Lawrence, May 1990.

“Seeded Hot Dark Matter Models for Large-scale Structure,” talk at the IUPAP Conference on Primordial Nucleosynthesis and the Evolution of the Early Universe, Tokyo, Sept. 1990.

“Reviving eV Neutrinos for Large-scale Structure,” seminar, University of California, Berkeley, Dec. 1990.

“Origin and Statistics of the Large-scale Structure of the Universe,” seminar, IBM Almaden Research Center, Dec. 1990.

“Statistics of Density Perturbations from Discrete Seed Masses”, seminar, University of California, Santa Cruz, Dec. 1990.

“Non-Gaussian Models for Large-Scale Structure”, seminar, Bartol Research Institute, Dec. 1991.

“Velocity Fields in some Non-Gaussian Models for Large-Scale Structure”, seminar, Fermilab, Mar. 1992.

“Velocity Fields in some Non-Gaussian Models for Large-Scale Structure”, seminar, Washington University, Mar. 1992.

“Velocity Fields in some Non-Gaussian Models for Large-Scale Structure”, seminar, University of Missouri, St. Louis, Mar. 1992.

“Non-Gaussian Models for Large-Scale Structure”, colloquium, Department of Astronomy, Ohio State University, Apr. 1992.

“The New COBE Results: The Third Most Important Discovery in the History of Cosmology”, colloquium, Department of Physics, Ohio State University, Apr. 1992.

“Dark Matter after COBE”, seminar, Aspen Center for Physics, Jul. 1992.

“The COBE Results and their Implications for the Large-Scale Structure of the Universe”, seminar, Case Western Reserve University, Oct. 1992.

“The COBE Results and their Implications for the Large-Scale Structure of the Universe”, colloquium, Notre Dame University, Nov. 1992.

“The COBE Results and their Implications for the Large-Scale Structure of the Universe”, seminar, Denison

University, Nov. 1992.

“The COBE Results and their Implications for the Large-Scale Structure of the Universe”, seminar, Wittenberg University, Jan. 1993.

“Introduction to the Large-Scale Structure of the Universe,” TASI summer school lectures, Jun. 1993.

“Skewness in Non-Gaussian Models,” seminar, Aspen Center for Physics, Aug. 1993.

“The COBE Results and their Implications for the Large-Scale Structure of the Universe”, seminar, Ohio Wesleyan University, Sept. 1993.

“The COBE Results and their Implications for the Large-Scale Structure of the Universe”, colloquium, Ohio University, Oct. 1993.

“The COBE Results and their Implications for the Large-Scale Structure of the Universe”, colloquium, Wooster College, Feb. 1994.

“Where do Peaks form in the Density Field?” seminar, Aspen Center for Physics, Jun. 1994.

“Linear Programming and Primordial Nucleosynthesis”, seminar, Case Western Reserve University, Nov. 1995.

“Linear Programming and Primordial Nucleosynthesis”, seminar, Department of Physics, Ohio State University, Mar. 1996.

“The Evolution of the Density Distribution Function in Large-Scale Structure”, seminar, Cambridge University, Jul. 1996.

“Zeroing in on the Fundamental Parameters of Cosmology”, invited plenary talk, International Conference on High-Energy Physics, Warsaw, Jul. 1996.

“The Evolution of the Density Distribution Function in Large-Scale Structure”, seminar, University of Florida, Sept. 1996.

“Echoes of Creation: Looking for the Large-Scale Structure of the Universe”, colloquium, Francis Marion University, Feb. 1997.

“Lattice Effects in Simulations of Topological Defect Formation”, 5th Great Lakes Cosmology Workshop, Columbus, May 1997.

“Zeroing In on the Fundamental Parameters of Cosmology”, colloquium, University of Wisconsin, Milwaukee, Oct. 1997.

“Initial Conditions for Topological Defects”, seminar, University of Wisconsin, Milwaukee, Oct. 1997.

“Initial Conditions for Topological Defects”, seminar, Notre Dame University, Oct. 1997.

“Constraints on the Effects of Locally-Biased Galaxy Formation”, seminar, Fermilab, Feb. 1998.

“Constraints on the Effects of Locally-Biased Galaxy Formation”, seminar, University of Illinois, Feb. 1998.

“Answering the Fundamental Questions in Cosmology”, colloquium, University of Houston, Mar. 1998.

“Constraints on Neutrino Properties from the Cosmic Microwave Background”, APS Workshop on the Five

Fundamental Parameters of Cosmology, Columbus, Apr. 1998.

“Answering the Fundamental Questions in Cosmology”, colloquium, University of Akron, Apr. 1999.

“Big Bang Nucleosynthesis”, invited plenary talk, Gamov Memorial International Conference, St. Petersburg, Russia, Aug. 1999.

“Cosmology and its Philosophical Implications: the Anthropic Principle and the Search for Origins”, invited talk, Regis University, Denver, Nov. 1999.

“Quintessence and the Cosmological Constant Coincidence Problem”, seminar, Vanderbilt University, Mar. 2000.

“The Effect of Relic Particle Annihilations on the Cosmic Microwave Background Spectrum”, DPF2000, Columbus, Aug. 2000.

“Cosmology and its Philosophical Implications: the Anthropic Principle and the Search for Origins”, invited talk, Pontifical College Josephinum, Columbus, Nov. 2002.

“The Cosmic Microwave Background: A New Window on Physics in the Early Universe”, colloquium, Vanderbilt University, Apr. 2003.

“The Cosmic Microwave Background: A New Window on Physics in the Early Universe”, colloquium, University of Tennessee, Sept. 2004.

“Dark Energy and the Coincidence Problem”, colloquium, University of Kansas, Mar. 2005.

“Dark Energy and the Coincidence Problem”, colloquium, Carnegie-Mellon University/University of Pittsburgh, Apr. 2005.

“Quarks and Cosmology”, talk at workshop on Cosmological Implications, RHIC & AGS Users’ Meeting, Brookhaven National Laboratory, Jun. 2005.

“Dark Energy and the Coincidence Problem”, colloquium, Western Kentucky University, Feb. 2006.

“Science and Science Fiction”, colloquium, Fermilab, Mar. 2006.

“Gary’s Science: 40 Years at the Interface”, opening keynote talk, Fundamental Astro-Particle Physics: A Conference in Celebration of Gary Steigman’s 65th Birthday, Columbus, May 2006.

“Science and Science Fiction”, colloquium, Florida State University, Nov. 2006.

“Science and Science Fiction”, colloquium, Vanderbilt University, Nov. 2006.

“Science and Science Fiction”, colloquium, Case Western Reserve University, Sept. 2007.

“Dark Energy and the Accelerated Expansion of the Universe”, colloquium, University of Alabama, Oct. 2008.

“Science and Science Fiction”, colloquium, University of Alabama, Oct. 2008.

“Klopsteg Memorial Lecture”, AAPT summer meeting, Jul. 2010.

“Anapole Dark Matter”, seminar, Ohio State University, Aug. 2012.

“Anapole Dark Matter”, seminar, University of Pennsylvania, Jan. 2013.

“Update/Review of Cosmological Estimates of Neutrino Number,” invited presentation, Cosmic Frontier Workshop at SLAC (Snowmass March Meeting), Mar. 2013.

“Anapole Dark Matter”, seminar, University of Florida, Aug. 2013.

“Could Dark Matter be Electromagnetic?” colloquium, Vanderbilt University, Oct. 2013.

“Quantum Mechanics and Time Travel”, public lecture, Belcourt Theater, Mar. 2014.

“Science and Science Fiction”, colloquium, Nashville State Community College, Apr. 2014.

“From Theorist’s Playground to Precision Science: The Evolution of Modern Cosmology”, colloquium, Lehigh University, Apr. 2014.

“Is the Universe Sticky? The Role of Viscosity in Cosmology”, seminar, Princeton University, Mar. 2015.

“How Well Do Dark Energy Parametrizations Match Physical Models?” seminar, Carnegie Mellon University, Oct. 2015.

“Science Fiction and the Cosmic Speed Limit,” panelist presentation, Chicago Society Space Conference, Apr. 2016.

“Science and Science Fiction”, colloquium, University of Illinois, Sept. 2016.

“Parametrizing Dark Energy: Promise and Pitfalls”, seminar, University of Illinois, Sept. 2016.

“Is the Universe Sticky? A New Approach to Cosmological Viscosity”, presentation at the Vanderbilt Symposium *Surprising Connections: Math, Physics, Computer Science, and Autism*, Vanderbilt University, Feb. 2017.

“Science and Science Fiction”, colloquium, Texas A&M University, Mar. 2017.

“What is the Universe Made Of?”, Meet the Astronomer lecture series, Dyer Observatory, Apr. 2017.

“Georges Lemaitre’s Contributions to Cosmology”, invited plenary talk, *Origins* conference, Society of Catholic Scientists, Chicago, Apr. 2017.

“Old and New Ideas on Relic Particle Abundances”, invited plenary talk, The Ohio State University Remembers Gary Steigman, Columbus, Nov. 2017.

“The Primordial Lithium Problem”, seminar, Harvard-Smithsonian Center for Astrophysics, Feb. 2018.

“The Primordial Lithium Problem”, seminar, Notre Dame, Mar. 2018.

“Science and Science Fiction”, colloquium, Notre Dame, Mar. 2018.

“What is the Universe Made Of?”, Lois McGlothlin Donaldson Endowed Lecture in Physics, University of Memphis, Apr. 2018.

Panelist, Symposium on “Science and Wonder,” University of Chicago, Mar. 2019.

“The Cloudy Crystal Ball: Does Science Fiction Predict the Future,” lecture for Belmont Symposium on “Mankind & the Moon”, Belmont University, Sept. 2019.

Panelist, “Art, Science , and Representations of Reality,” as part of the Belmont Symposium on “Mankind & the Moon”, Belmont University, Sept. 2019

“New Directions in Dark Matter”, colloquium, University of Alabama, Oct. 2019.

“What is the Universe Made Of?”, Blount Scholars Program convocation, University of Alabama, Mar. 2020.

“New Directions in Dark Matter”, colloquium, University of Illinois, Mar. 2020.

“The Webb Telescope’s Big Quests”, Profs and Pints Lecture Series, Nashville, Sept. 2022.