

## **Philip David Mannheim – Recent Seminars**

### **2000**

1. Cosmic acceleration as the solution to the cosmological constant problem, seminar presented at MIT at joint MIT-CFA-Tufts cosmology seminar, February, 2000.
2. Conformal gravity I, seminar presented at MIT, March, 2000.
3. Conformal gravity II, seminar presented at MIT, March, 2000.
4. Cosmic acceleration as the solution to the cosmological constant problem, seminar presented at Brandeis University, March, 2000.
5. How good is Newton's law of gravity?, colloquium presented at University of Miami, April, 2000.
6. How we got into the dark matter fix and how we can get out, seminar presented at MIT, May, 2000.
7. Cosmic acceleration as the solution to the cosmological constant problem, seminar presented at Boston University, May, 2000.
8. Conformal gravity III, seminar presented at MIT, May, 2000.
9. Brane-localized gravity: could there be a macroscopically sized fifth dimension?, seminar presented at University of Connecticut, Storrs, September, 2000.
10. Dynamical localization of gravity, seminar presented at University of Connecticut, Storrs, September, 2000.
11. The crystal impurity problem and the Mossbauer effect, seminar presented at Argonne National Laboratory, November, 2000.
12. Gravitationally induced quantum interference, seminar presented at Argonne National Laboratory, November, 2000.
13. Brane-localized gravity, seminar presented at Argonne National Laboratory, November, 2000.
14. Cosmic acceleration and a natural solution to the cosmological constant problem, conference seminar presented at Orbis Scientiae 2000, Fort Lauderdale, Florida, December 2000.
15. Conformal gravity and a naturally small cosmological constant, poster presentation at 20th Texas Symposium on Relativistic Astrophysics, Austin, Texas, December 2000.

## 2001

1. The crystal impurity problem and the Mossbauer effect, seminar presented at University of Connecticut, Storrs, January, 2001.
2. Brane cosmology, seminar presented at MIT, February, 2001.
3. Cosmic acceleration as the solution to the cosmological constant problem, seminar presented at Texas A and M, March, 2001.
4. How we got into the dark matter fix and how we can get out, colloquium presented at University of Texas, March, 2001.
5. How recent is cosmic acceleration?, seminar presented at University of Connecticut, Storrs, May, 2001.
6. Recent developments in the crystal impurity problem, seminar presented at Argonne National Laboratory, Argonne, July 2001.
7. How recent is cosmic acceleration?, seminar presented at Argonne National Laboratory, Argonne, July 2001.
8. Gravitationally induced quantum interference, colloquium presented at Argonne National Laboratory, November 2001.
9. Localization issues for Robertson-Walker branes, conference seminar presented at Coral Gables 2001, Fort Lauderdale, Florida, December 2001.
10. Is cosmic acceleration really recent?, conference seminar presented at Coral Gables 2001, Fort Lauderdale, Florida, December 2001.

## 2002

1. How recent is cosmic acceleration?, seminar presented at Yale University, April 2002.
2. How we got into the dark matter fix and how we can get out, seminar presented at University of St. Andrews, St. Andrews Scotland, August 2002.
3. How we got into the dark energy fix and how we can get out, seminar presented at University of St. Andrews, St. Andrews Scotland, August 2002.
4. How recent is cosmic acceleration?, invited presentation at Cross-Channel Conference, Plymouth, England, August 2002.
5. The accelerating universe, colloquium presented at Daytona Beach Community College, Daytona, November 2002.
6. How we got into the dark matter fix and how we can get out, seminar presented at SLAC, Stanford University, December 2002.

7. Living with a large cosmological constant, seminar presented at SLAC, Stanford University, December 2002.
8. How recent is cosmic acceleration?, seminar presented at LBL, Berkeley, December 2002.
9. The accelerating universe, colloquium presented at San Francisco State University, December 2002.
10. Options for cosmology at redshifts above one, invited presentation at Coral Gables 2002 Conference, Fort Lauderdale, Florida, December 2002.

## **2003**

1. How recent is cosmic acceleration?, seminar presented at Liverpool University, England, January 2003.
2. How we got into the dark matter fix and how we can get out, seminar presented at University of Florida, Gainesville, April 2003.
3. Living with a large cosmological constant, seminar presented at University of Florida, Gainesville, April 2003.
4. Living with a large cosmological constant, invited presentation at the 8th Wigner symposium, CUNY, New York City, May 2003.
5. Dark matter and dark energy - fact or fantasy, colloquium presented at University of Oxford, Oxford, England, August 2003.
6. Living with a large cosmological constant, seminar presented at University of Oxford, Oxford, England, August 2003.
7. Living with a large cosmological constant, invited seminar presented at Cosmo-03 Conference, Ambleside, England, August 2003.
8. The work of Behram Kursunoglu, invited seminar presented at Coral Gables Conference, Fort Lauderdale, December 2003.
9. Dark matter and dark energy - fact or fantasy, invited seminar presented at Coral Gables Conference, Fort Lauderdale, December 2003.

## **2004**

1. Dark matter and dark energy - fact or fantasy, seminar presented at University of Cardiff, Cardiff, Wales, January 2004.
2. Dark matter and dark energy - fact or fantasy, seminar presented at University of Bristol, Bristol, England, January 2004.
3. Dark matter and dark energy - fact or fantasy, colloquium presented at Louisiana State University, Baton Rouge, January 2004.

4. The most expensive way to measure the velocity of sound, seminar presented at University of Connecticut, Storrs, February 2004.
5. Dark matter and dark energy - fact or fantasy, invited seminar presented at MRST Conference, Montreal, Canada, May 2004.
6. Dark matter and dark energy – fact or fantasy, seminar presented at Ben Gurion University of the Negev, Beersheva, Israel, July 2004.
7. Bounds on localized modes in the crystal impurity problem, seminar presented at the Budnickfest, University of Connecticut, Storrs, September 2004.
8. Quantizing acceleration dependent Lagrangians, seminar presented at the University of Connecticut, Storrs, November 2004.

## **2005**

1. Dark matter and dark energy – fact or fantasy, seminar presented at University of Lancaster, Lancaster, England, March 2005.
2. Dark matter and dark energy – fact or fantasy, seminar presented at Rockefeller University, New York, May 2005.
3. Bounds on localized modes in the crystal impurity problem, seminar presented at Argonne National Laboratory, October 2005.
4. Alternatives to dark matter and dark energy, seminar presented at Kavli Institute, University of Chicago, October 2005.
5. Dark matter and dark energy – fact or fiction, seminar presented at University of Connecticut, Storrs, November 2005.
6. Dark matter and dark energy – fact or fiction, colloquium presented at Perimeter Institute, Waterloo, Canada, November 2005.
7. Dark matter and dark energy – fact or fiction, seminar presented at University of Toronto, Canada, November 2005.
8. Bounds on localized modes in the crystal impurity problem, seminar presented at University of Connecticut, Storrs, November 2005.
9. Dark matter and dark energy – fact or fiction, seminar presented at University of Liverpool, England, December 2005.
10. Dark matter and dark energy – fact or fiction, seminar presented at University of Manchester, England, December 2005.

## 2006

1. Gauge invariant treatment of the energy of a gravitational wave, seminar presented at University of Connecticut, Storrs, January 2006.
2. Dark matter and dark energy – fact or fiction, seminar presented at Imperial College, London, England, February 2006.
3. Dark matter and dark energy – fact or fiction, seminar presented at Fermilab, March 2006.
4. Causality in the brane world, seminar presented at Fermilab, March 2006.
5. Conformal gravity and dark energy, invited plenary presentation at Alternative Gravities and Dark Matter Workshop, Edinburgh, Scotland, April 2006.
6. Dark matter and dark energy – fact or fiction, seminar presented at Syracuse University, May 2006.
7. Cosmology in the Dvali-Gabadaze-Porrati brane world, seminar presented at Cornell/Syracuse Dark Energy Workshop, Syracuse University, May 2006.
8. Dark matter and dark energy – fact or fiction, seminar presented at Cornell University, May 2006.
9. Solution to the ghost problem in fourth order derivative theories, seminar presented at the 2006 Biennial Meeting of the International Association for Relativistic Dynamics, Storrs, May 2006.
10. Grassmann extension of the Stuckelberg proper time formulation of quantum mechanics, seminar presented at the 2006 Biennial Meeting of the International Association for Relativistic Dynamics, Storrs, May 2006.
11. Causality in the brane world, seminar presented at the 26th International Colloquium on Group Theoretical Methods in Physics, New York City, June 2006.
12. Dark matter and dark energy – fact or fiction, seminar presented at University of Pennsylvania, November 2006.
13. The 2006 Nobel prize in physics, colloquium presented at University of Connecticut, Storrs, November 2006.
14. Dark matter and dark energy – fact or fiction, seminar presented at McGill University, Montreal, November 2006.
15. Einstein's incredible legacy, colloquium presented at Bishop's University, Sherbrooke, Quebec, November 2006.
16. Einstein's incredible legacy, colloquium presented at Stockton College, Pomona, New Jersey, December 2006.

17. Causality and completeness issues in the brane world, seminar presented at New York University, December 2006.
18. Introduction to the brane world, seminar presented at SUNY Stony Brook, December 2006.
19. Alternatives to dark matter and dark energy, seminar presented at SUNY Stony Brook, December 2006.
20. Causality and completeness issues in the brane world, seminar presented at the Miami 2006 Conference, Fort Lauderdale, December 2006.

## **2007**

1. Dark matter and dark energy – fact or fiction, invited talk presented at the "Open Questions for the Standard Cosmological Model" conference, Imperial College London, March 2007.
2. Dark matter and dark energy – fact or fiction, seminar presented at Los Alamos National Laboratory, May 2007.
3. Conformal gravity challenges string theory, invited talk presented at Pascos-07 symposium, Imperial College London, July 2007.
4. Dark matter and dark energy – fact or fiction, colloquium presented at University of Kansas, October 2007.
5. Dark matter and dark energy – fact or fiction, seminar presented at University of Wisconsin, October 2007.
6. Conformal gravity challenges string theory, seminar presented at University of Minnesota, October 2007.
7. Conformal gravity challenges string theory, invited talk presented at the Miami 2007 Conference, Fort Lauderdale, December 2007.

## **2008**

1. Dark matter and dark energy – fact or fiction, seminar presented at University of Durham, Durham UK, February 2008.
2. Conformal gravity challenges string theory, seminar presented at University of Oxford, Oxford, February 2008.
3. Conformal gravity challenges string theory, seminar presented at California Institute of Technology, Pasadena, March 2008.
4. Conformal gravity challenges string theory, seminar presented at University of California at Los Angeles, March 2008.

5. Einstein's incredible legacy, colloquium presented at Fresno State University, Fresno, California, March 2008.
6. Quantum Mechanics off the beaten track, colloquium presented at Washington University, St. Louis, April 2008.
7. Dark matter and dark energy – fact or fiction, colloquium presented at University of Nebraska, May 2008.
8. Conformal gravity challenges string theory, invited talk presented at Pascos-08 symposium, Perimeter Institute, Waterloo Canada, June 2008.
9. Conformal gravity challenges string theory, invited talk presented at the 34th International Conference on High Energy Physics (ICHEP08), Philadelphia, July 2008.
10. Does the cosmological constant problem presage a paradigm shift in gravitational theory?, invited talk at the Second Crisis in Cosmology Conference, Port Angeles, WA, September 2008.
11. Doing physics with non-diagonalizable Hamiltonians and the solution to the ghost problem in fourth-order derivative theories, seminar presented at Syracuse University, September 2008.
12. Quantum mechanics off the beaten track, colloquium presented at University of Connecticut, Storrs, October 2008.
13. The 2008 Nobel prize in physics, seminar presented at University of Connecticut, Storrs, November 2008.
14. Doing physics with non-diagonalizable Hamiltonians and the solution to the ghost problem in fourth-order derivative theories, seminar presented at Perimeter Institute, Waterloo Canada, November 2008.
15. Doing physics with non-diagonalizable Hamiltonians and the solution to the ghost problem in fourth-order derivative theories, invited talk presented at Miami 2008 Conference, Fort Lauderdale, December 2008.

## **2009**

1. Does the cosmological constant problem presage a paradigm shift in gravitational theory?, invited talk at Intertwining Theory and Observational Evidence in Contemporary Cosmology, Wuppertal Germany, February 2009.
2. Doing physics with non-diagonalizable Hamiltonians and the solution to the ghost problem in fourth-order derivative theories, invited talk presented at Quantum Mechanics in the Complex Domain, St. Louis, March 2009.
3. Doing physics with non-diagonalizable Hamiltonians and the solution to the ghost problem in fourth-order derivative theories, seminar at the University of Chicago, April 2009.

4. Comprehensive Solution to the Cosmological Constant, Zero-Point Energy, and Quantum Gravity Problems, seminar at University of Pennsylvania, September 2009.
5. Quantum Gravity, colloquium at the University of Connecticut, October 2009.
6. Quantum Gravity – The Details, seminar at the University of Connecticut, October 2009.
7. Comprehensive Solution to the Cosmological Constant, Zero-Point Energy, and Quantum Gravity Problems, invited talk presented at the Miami 2009 Conference, Fort Lauderdale, December 2009.

## 2010

1. Quantum Conformal Gravity and Grandunification, seminar at Syracuse University, February 2010.
2. Comprehensive Solution to the Cosmological Constant, Zero-Point Energy, and Quantum Gravity Problems, seminar at Syracuse University, February 2010.
3. Comprehensive Solution to the Cosmological Constant, Zero-Point Energy, and Quantum Gravity Problems, seminar at University of Minnesota, February 2010.
4. Comprehensive Solution to the Cosmological Constant, Zero-Point Energy, and Quantum Gravity Problems, seminar at University of Wisconsin, February 2010.
5. Comprehensive Solution to the Cosmological Constant, Zero-Point Energy, and Quantum Gravity Problems, seminar at Imperial College, London, March 2010.
6. Classical Aspects of the Dark Matter and Dark Energy Problems, seminar at SUNY Stony Brook, April 2010.
7. Quantum Aspects of the Dark Matter and Dark Energy Problems, seminar at SUNY Stony Brook, April 2010.
8. Comprehensive Solution to the Cosmological Constant, Zero-Point Energy, and Quantum Gravity Problems, seminar at Brookhaven National Laboratory, April 2010.
9. Intrinsically Quantum-Mechanical Curvature and the Cosmological Constant Problem, seminar at Oxford University, June 2010.
10. Doing Physics with Non-Hermitian and Non-Diagonalizable Hamiltonians, seminar at Oxford University, June 2010.
11. Intrinsically Quantum-Mechanical Curvature and the Cosmological Constant Problem, seminar at Vanderbilt University, August 2010.
12. Impact of a Global Quadratic Potential on Galactic Rotation Curves, seminar at Vanderbilt University, August 2010.



13. Intrinsically Quantum-Mechanical Curvature and the Cosmological Constant Problem, invited talk presented at the International Conference on Two Cosmological Models, Universidad Iberoamericana, Mexico City, November 2010.
14. Impact of a Global Quadratic Potential on Galactic Rotation Curves, invited talk presented at the International Conference on Two Cosmological Models, Universidad Iberoamericana, Mexico City, November 2010.
15. Intrinsically Quantum-Mechanical Curvature and the Cosmological Constant Problem, seminar at McGill University, November 2010.
16. Intrinsically Quantum-Mechanical Curvature and the Cosmological Constant Problem, seminar at Universite de Montreal, November 2010.
17. Alternatives to Dark Matter, colloquium at Universite de Montreal, November 2010.
18. Impact of a Global Quadratic Potential on Galactic Rotation Curves, invited talk presented at the Miami 2010 Conference, Fort Lauderdale, December 2010.

## **2011**

1. Observational Evidence for the Non-Diagonalizable Hamiltonian of Conformal Gravity, invited talk at the Quantum Physics with Non-Hermitian Operators Conference, Dresden, June 2011.
2. Observational Evidence for the Non-Diagonalizable Hamiltonian of Conformal Gravity, invited talk at the PT Quantum Mechanics Conference, Heidelberg, September 2011.
3. Why We Believe in Dark Matter and Dark Energy – and Do We Have To?, colloquium at Rutgers, October 2011.
4. Why We Believe in Dark Matter and Dark Energy – and Do We Have To?, colloquium at Wesleyan, November 2011.
5. The 2011 Nobel Prize in Physics, colloquium at University of Connecticut, Storrs, November 2011.
6. Cosmological Perturbations in Conformal Gravity, seminar at Universite de Montreal, November 2011.
7. Making the Case for Conformal Gravity, invited talk at the Miami 2011 Conference, Fort Lauderdale, December 2011.

## 2012

1. Making the Case for Conformal Gravity, seminar at Perimeter Institute, Waterloo Canada, July 2012.
2. Making the Case for Conformal Gravity, seminar at University of Utrecht, Netherlands, August 2012.
3. PT Symmetry as a Necessary and Sufficient Condition for Unitary Time Evolution, invited talk at the PHHQ XI: Non-Hermitian Operators in Quantum Physics, Paris, August 2012.
4. Why We Believe in Dark Matter and Dark Energy – and Do We Have To?, colloquium at Concordia University, Montreal, November 2012.
5. Making the Case for Conformal Gravity, seminar at Universite de Montreal, November 2012.
6. Solution to the Ghost Problem in Fourth-Order Derivative Theories and its Implications for Gravity and Astrophysics, seminar at McGill University, Montreal, November 2012.
7. PT Symmetry as a Necessary and Sufficient Condition for Unitary Time Evolution, invited talk at the Miami 2012 Conference, Fort Lauderdale, December 2012.

## 2013

1. Consistency of Conformal Gravity as a Microscopic Theory and its Implications for Gravity and Astrophysics as a Macroscopic One, seminar at Yale University April 2013.
2. Why there is a Cosmological Constant Problem, and what we can do about it, invited talk at Tales of Lambda Conference, Nottingham England, July 2013.
3. Why there is a Cosmological Constant Problem, and what we can do about it, seminar at Washington University, September 2013.
4. The 2013 Nobel Prize for the Higgs Boson, colloquium at the University of Connecticut, Storrs, November 2013.
5. Why there is a Cosmological Constant Problem, and what we can do about it, seminar at Syracuse University, November 2013.
6. Why Gravity cannot be Quantized Canonically, and what we can do about it, invited talk at the Miami 2013 Conference, Fort Lauderdale, December 2013.

## 2014

1. The Crisis in Fundamental Physics, colloquium at the University of New Haven, May 2014.
2. Introduction to PT Symmetry, invited talk at the 9th Biennial Meeting of the International Association for Relativistic Dynamics, Storrs CT, June 2014.
3. Torsion: what it is and how to constrain it, invited talk at the 9th Biennial Meeting of the International Association for Relativistic Dynamics, Storrs CT, June 2014.
4. PT Symmetry, Conformal Symmetry, and the Metrication of the Fundamental Forces, seminar at City University, London, July 2014.
5. PT Symmetry, Conformal Symmetry, and the Metrication of the Fundamental Forces, invited talk at the New England Section of the American Physical Society Meeting, Wentworth Institute of Technology, Boston, November 2014.
6. PT Symmetry, Conformal Symmetry, and the Metrication of the Fundamental Forces, seminar at the University of Connecticut, Storrs, November 2014.
7. PT Symmetry, Conformal Symmetry, and the Metrication of the Fundamental Forces, invited talk at the Discrete 2014 Conference, King's College London, December 2014.
8. PT Symmetry, Conformal Symmetry, and the Metrication of the Fundamental Forces, invited talk at the Miami 2014 Conference, Fort Lauderdale, December 2014.

## 2015

1. Why physicists are interested in Differential Geometry, seminar at the University of Connecticut, Storrs, February, 2015.
2. Advancing the case for PT Symmetry – the Hamiltonian is always PT Symmetric, invited talk at Quantum (and Classical) Physics with Non-Hermitian Operators (PHHQP13), Jerusalem, July 2015.
3. Living Without Supersymmetry – the Conformal Alternative and a Dynamical Higgs Boson, seminar at Washington University, November 2015.
4. Living Without Supersymmetry – the Conformal Alternative and a Dynamical Higgs Boson, invited talk at the Miami 2015 Conference, Fort Lauderdale, December 2015.

## 2016

1. Neutrino Oscillations – The 2015 Nobel Prize in Physics, colloquium at the University of Connecticut, Storrs, January 2016.
2. Living Without Supersymmetry – the Conformal Alternative and a Dynamical Higgs Boson, seminar at Imperial College London, May 2016.
3. Living Without Supersymmetry – the Conformal Alternative and a Dynamical Higgs Boson, seminar at King's College London, May 2016.
4. CPT Symmetry Without Hermiticity, invited talk at ICHEP2016, the 38th International Conference on High Energy Physics, Chicago, August 2016.
5. Antilinearity Rather than Hermiticity as a Guiding Principle for Quantum Theory, seminar at the University of Connecticut, Storrs, November 2016.
6. Antilinearity Rather than Hermiticity as a Guiding Principle for Quantum Theory, invited talk at the Miami 2016 Conference, Fort Lauderdale, December 2016.

## 2017

1. Antilinearity Rather than Hermiticity as a Guiding Principle for Quantum Theory, invited talk at Pseudo-Hermitian Hamiltonians in Quantum Physics (PH-HQP17), Bad Honnef, Germany, May 2017.
2. Living Without Supersymmetry – the Conformal Alternative and a Dynamical Higgs Boson, seminar at Niels Bohr Institute, Copenhagen, May 2017.
3. Living Without Supersymmetry – the Conformal Alternative and a Dynamical Higgs Boson, seminar at the University of Liverpool, May 2017.
4. Living Without Supersymmetry – the Conformal Alternative and a Dynamical Higgs Boson, seminar at the University of Manchester, May 2017.
5. The Crisis in Fundamental Physics, SUNY Albany, September 2017.
6. Quantum Conformal Gravity, seminar at University of Utrecht, Netherlands, October 2017.
7. Antilinearity Rather than Hermiticity as a Guiding Principle for Quantum Theory, seminar at Wien Technical University, Vienna, October 2017.
8. Quantum Conformal Gravity, seminar at Wien Technical University, Vienna, October 2017.
9. Is the Cosmological Constant Problem Properly Posed?, seminar at CERN, October, 2017.

10. The 2017 Nobel Prize in Physics, Colloquium at the University of Connecticut Physics Department, November, 2017.
11. The 2017 Nobel Prize in Physics, colloquium at the University of Connecticut Mathematics Department, December, 2017.
12. Anomalous Dimensions and the Renormalizability of the Four-Fermion Interaction, invited talk at the Miami 2017 Conference, Fort Lauderdale, December 2017.

## **2018**

1. Quantum Conformal Gravity, seminar at the University of Cambridge, United Kingdom, June 2018.