

COLEMAN, Piers

Condensed Matter (Theory)

Professor, Rutgers University.

Born 1958, Cheltenham, Gloucestershire, UK.

Nationality: UK/US Citizen

Education:

B.A., Cambridge University 1979

Ph.D., Princeton University 1984

Advisor: Prof. P. W. Anderson

Positions :

Professor II, Rutgers University	2002
Professor, Rutgers University	1997- 2002
Associate Professor, Rutgers University	1991- 1997
Assistant Professor, Rutgers University	1987- 1991
Junior Research Fellow, Trinity College, Cambridge	1984- 1989
Postdoctoral Fellow, ITP, U. C. Santa Barbara,	1984- 1986

Active Grants and Fellowships:

DOE Grant "Spin driven phenomena in Strongly Correlated Materials."	\$360,000	2012-2015
N.S.F. Grant "Local Moment and Heavy Fermion Physics"	\$270,000	2013-2016

Awards, distinctions and visiting positions

U. London Chair Theoretical Condensed Matter Physics, Royal Holloway College,	2010-
Sabbatical Visitor, Centro Brasileiro de Pesquisas Físicas, Rio de Janeiro, Brazil	2013 Apr-May
Sabbatical Visitor, Karlsruhe Institute for Technology, Germany	2013 Feb-Mar
Fellow, American Physics Society,	2000
Fellow, Institute of Physics, UK	1999
Visiting Fellow, University College, Oxford	1997 Jan-Jun
Lecturer du Troisième Cycle, U. Lausanne, Switzerland	1991
Research Visitor, Landau Inst. , Moscow, USSR.	1989 Oct
Sloan Foundation Fellowship	1989
First Wohlfarth Memorial Lecture, Imperial College, UK.	1989 Apr

Directorships, committees .

Codirector, Institute for Complex Adaptive Phenomena	2011-2014
International Advisory committee, SCES 13, Tokyo	2013
International Advisory committee, SCES 12, Busan	2012
International Advisory committee, SCES 11, Cambridge	2011
Gordon Research Conferences, Selection and Scheduling Committee	2009- 2014
Member APS Panel on Public Affairs,	2007- 2010
International Advisory committee, SCES 10, Santa Fe	2010
Co-organizer 2008 NSF Boulder summer school	2007- 2008
Member, Editorial board, Reports on Progress in Physics	2007-
Organizer, I2CAM FAPERJ school, Rio de Janeiro,	2007, 2010
Organizer, Trieste Miniworkshop on Strongly Correlation	1992- 2012
Executive Committee, Institute for Complex Adaptive Matter	2006 -
Steering committee, UK “Portfolio research Partnership”.	2005 -2008
International Advisory committee, SCES 05, Vienna	2004- 2005
Organizer, KITP, Workshop on Quantum Phase Transitions.	2005
Organizer, “Frontiers in Correlated Matter” Aspen Snowmass.	2004
Advisory committee, SCES 04, Karlsruhe	2003- 2004
Organizer, ICAM conf “Quantum Criticality”, Columbia U.	2003 March
US Editor, Journal of Physics, Condensed Matter	1999-2000
Advisory committee, SCES 98, Paris, France	1997- 1998
Organizer, ITP, Santa Barbara Workshop on Non Fermi Liquids.	1996
Advisory committee, SCES 94, Amsterdam, Holland	1993-1994
Lecturer du Troisieme Cycle, U. Lausanne, Switzerland	1991
Les Houches Summer School, France . Invited Lecturer.	1991 Aug
Kathmandu Summer School, Nepal. Invited Lecturer.	1991 Jun
Advisory committee, ICVF, Rio de Janerio, Brazil	1990 Jul
Participant, Last US-Soviet Academy CMP scientific exchange, USSR.	1988 Oct

Outreach activities: Videos, performances and productions, websites

“Emergent behavior in Quantum Matter”, P. Coleman and P. Chaikin, outreach video
 (Harvard Smithsonian, 2010) www.learner.org/courses/physics/unit/unit_vid.html?unit=8
“Music of the Quantum” musicofthequantum.rutgers.com
“Frontiers of Condensed Matter Physics” frontiers.physics.rutgers.edu/blog_main.html

Past Students and Postdocs

Graduate Students:

Ian Ritchey.	(Rolls Royce, Head of Turbine Division)
Deng Feng Wang	(Financial Services, New York (since deceased))
Junwu Gan.	(Financial Services, San Fransisco)
Eduardo Miranda.	(Professor, U. Campinas, Brazil)
Juana Moreno.	(Associate Prof, Lousianna State U)
John Hopkinson.	(Assistant Professor, U. Manitoba, Canada)
Revaz Ramashvili.	(Staff member, CNRS Toulouse)
Andrew Ho.	(Lecturer, Royal Holloway, U. London)
Indranil Paul.	(Staff member CNRS, Paris);
Nayana Shah.	(Assistant Prof, U. Cincinatti)
Jerome Rech,	(Staff member, CNRS, Marseille)
Marianna Maltseva,	(Citi Bank, NY),
Lucia Palova,	(Postdoc, Columbia U),
Ilya Berndnikov,	(Director, Knight Capital London),
Rebecca Flint,	(Junior Faculty, Iowa State U)
Aline Ramires,	(Rutgers)
Victor Alexandrov,	(Rutgers)

Postdocs:

Andrew Schofield	(Prof and HOD, U. Birmingham, UK)
Arghya Taraphder	(Lecturer, IIT Kharagpur, India)
Hae Young Kee	(Prof, U. Toronto, Canada)
Chris Hooley	(Lecturer, U. St Andrews, UK)
Vikram Tripathi	(Lecturer, TIFR, Mumbai, India)
Wenjin Mao	(Financial Services, New York)
Eran Lebanon	(Data Mining, Israel)
Maxim Dzero.	(Assistant Prof, Kent State U., USA)
Andriy Nevidomskyy.	(Assistant Prof, Rice U., USA)
Tzen Ong	(Rutgers)
Maxim Kharitinov	(Rutgers)
Onur Erten	(Rutgers)

Publications:(About 150 publications in refereed journals, 3800 citations. H-index 41)

1. “*Many Body Physics, an introduction*”, in preparation, to be published Cambridge University Press, 2014.
2. “*Theory for the Electron Spin Resonance mode of $YbBaAl_4$* ” Aline Ramires and Piers Coleman submitted to Physical Review B, (2013).

3. “*Strange Metal Phase Detached from Magnetism in the Mixed Valent Compound YbBaAl₄*”, T. Tomita, K. Kuga, Y. Uwatoko, P. Coleman and S. Nakatsuji, submitted for publication (2013).
4. “*Origin of the Large Anisotropy in the χ_3 Anomaly in URu₂Si₂*” Premala Chandra, Piers Coleman and Rebecca Flint, J. of Physics: Conference Series 449, 012026 (2013).
5. “*Hastatic order: a theory for the hidden order in URu₂Si₂*”, Premala Chandra, Piers Coleman and Rebecca Flint, Nature, 493, 621-626 (2013).
6. *β -YbAlB₄: a critical nodal metal*, Aline Ramires, Piers Coleman, Andriy H. Nevidomskyy, A. M. Tsvelik, Phys. Rev. Lett. 109, 176404 (2012).
7. *Emergent Critical Phase and Ricci Flow in a 2D Frustrated Heisenberg Model*, Peter P. Orth, Premala Chandra, Piers Coleman, Joerg Schmalian, Phys. Rev. Lett. 109, 237205 (2012).
8. *The symplectic-N t-J model and s^{\pm} superconductors*, Rebecca Flint and Piers Coleman, Physical Review B 86, 184508 (2012).
9. “*T/B scaling of magnetization in the mixed valent compound β - YbAlB₄*”, Y. Matsumoto, S. Nakatsuji, K. Kuga, Y. Karaki, N. Horie, Y. Shimura, T. Sakakibara, A. H. Nevidomskyy and P. Coleman, proceedings SCES 2011, special conference issue of J. Phys. Cond. Matt, **391**, 012041 (2012).
10. “*Basal-Plane Nonlinear Susceptibility: A Direct Probe of the Single-Ion Physics in URu₂Si₂*” Rebecca Flint, Premala Chandra and Piers Coleman, Phys. Rev. B 86, 155155 (2012).
11. “*Dimensions are critical*” News and views, Nature materials, *Nature Materials* 11, 185-186, (2012).
12. “*Spin and Holographic Metals*”, Victor Alexandrov and Piers Coleman, *Phys. Rev. B* **86**, 125145 (2012). (Editors suggestion).
13. “*Local Quantum Criticality of an Iron-Pnictide Tetrahedron*”, T. Tzen Ong, Piers Coleman, Phys. Rev. Lett. 108, 107201 (2012).
14. “*Theory of Topological Kondo Insulators*”, Maxim Dzero, Kai Sun, Piers Coleman and Victor Galitski, *Phys. Rev. B* **85**, 045130-045140 (2012).
15. “*Microscopy of the macroscopic*”, Piers Coleman, News and Views Article, Nature **474**, 290-291 (2011).
16. *Quasiparticle interference in an iron-based superconductor*, S. Sykora, Piers Coleman, *Phys. Rev. B*, Phys. Rev. B 84, 054501 (2011).
17. *Composite pairing in a mixed valent two channel Anderson model* R. Flint, A. Nevidomskyy and Piers Coleman, *Phys. Rev. B* 84, 064514 (2011).

18. *Quantum Criticality without Tuning in the Mixed Valence Compound $\beta\text{YbAlB}_4\text{Y}$* . Matsumoto, S. Nakatsuji, K. Kuga, Y. Karaki, N. Horie, Y. Shimura, T. Sakakibara, A. H. Nevidomskyy, P. Coleman, *Science*, 331, 316 (2011).
19. “*Tandem Pairing in Heavy Fermion Superconductors*” Rebecca Flint, Piers Coleman, *Phys. Rev. Lett.*, PRL **105**, 246404 (2010).
20. *Magnetization, Maxwell’s Relations and the Local Physics of the Dilute System $\text{Th}_{1-x}\text{U}_x\text{Ru}_2\text{Si}_2$* , Anna Toth, Premala Chandra, Piers Coleman, Gabriel Kotliar, Hiroshi Amitsuka, *Physical Review B* 82, 235116 (2010).
21. “*Frustration and the Kondo effect in heavy fermion materials*” Piers Coleman, Andriy H. Nevidomskyy, *Journal of Low Temperature Physics* 161, 182-202 (2010).
22. “*Evidence for a Non-Fermi-Liquid Phase in Ge-Substituted YbRh_2Si_2* ” J. Custers, P. Gegenwart, C. Geibel, F. Steglich, P. Coleman, S. Paschen, *Phys. Rev. Lett.* 104, 186402 (2010).
23. “*Topological Kondo Insulators*”, Maxim Dzero, Kai Sun, Victor Galitski and Piers Coleman, *Phys. Rev. Lett.* 104, 106408 (2010).
24. “*The Low Down on Heavy Fermions*”, Piers Coleman, *Science*, 327, 969 - 970 (2010)
25. “*Quantum Criticality and Novel Phases: A panel discussion*” Piers Coleman, *Physica Status Solidi B*, 247, 506 - 512 (2010).
26. “*Electron Cotunneling into a Kondo Lattice*” Marianna Maltseva, M. Dzero, P. Coleman *Phys. Rev. Lett.* 103, 206402 (2009).
27. “*The Casimir Effect from a Condensed Matter Perspective*” L. Palova, P. Chandra, P. Coleman, *Am. J. Phys.* 77 1055 (2009).
28. “*Heavy Electrons: The Gathering Storm of Data*”, P. Chandra and P. Coleman, *News and Views, Nature Physics* 5, 625 (2009).
29. *Quantum Critical Paraelectrics and the Casimir Effect in Time* L. Palova, P. Chandra, P. Coleman, *PRB* 79, 075101 (2009).
30. “*Kondo resonance narrowing in d- and f-electron systems* Andriy H. Nevidomskyy, P. Coleman, *Phys. Rev. Lett.* 103, 147205 (2009).
31. “*Model for nodal quasiparticle scattering in a disordered vortex lattice*”, Marianna Maltseva, P. Coleman, *Phys. Rev. B* 80, 144514 (2009).
32. *Coherence factors in a high- T_c cuprate probed by quasi-particle scattering*, T. Hanaguri, Y. Kohsaka, M. Ono, M. Maltseva, P. Coleman, I. Yamada, M. Azuma, M. Takano, K. Ohishi, H. Takagi, *Science* 323, 923-926 (2009).

33. “Symplectic N and time reversal in frustrated magnetism” , Rebecca Flint and P. Coleman, *Physical Review B* 79, 014424 (2009).
34. “Layered Kondo Lattice model for quantum critical β -YbAlB₄”, Andriy H. Nevidomskyy and P. Coleman, *Phys. Rev. Lett.* 102, 077202 (2009).
35. “Itinerant Ferromagnetism in an Atom Trap.” Ilya Berndnikov, P. Coleman and S. Simon, *Physical Review B*,79, 224403 (2009).
36. “Observation of a multiferroic critical end point”, Jae Wook Kim, S. Y. Haam, Y. S. Oh, S. Park, S.-W. Cheong, P. A. Sharma, M. Jaime, N. Harrison, Jung Hoon Han, Gun-Sang Jeon, P. Coleman and Kee Hoon Kim, *Proc. Nat. Acad. Sci.* 106, 15573-15576 (2009).
37. “Lending an iron hand to spintronics”, P. Coleman, *Physics*, Jan 20th, 2009, <http://physics.aps.org/articles/v2/6>.
38. “Heavy electrons and the symplectic symmetry of the electron spin”, Rebecca Flint, M. Dzero, P. Coleman, *Nature Physics* 4, 643 - 648 (2008).
39. *Quantum Critical Paraelectrics and the Casimir Effect in Time*, L. Pálová, P. Chandra and P. Coleman, *PRB* 79, 075101 (2009).
40. *Angle dependent quasiparticle weights in correlated metals* Pouyan Ghaemi, T. Senthil, P. Coleman, *Phys. Rev. B* 77, 245108 (2008).
41. *Frontier at your fingertips* P. Coleman, *Nature Connections Article*, *Nature* 446, 379 (22 March 2007).
42. *Sleuthing Hidden Order*, V. Tripathi, P. Chandra, P. Coleman, *Nature Physics* 3, 78-80 (2007).
43. *Quantum criticality and the break-up of the Kondo pseudo-potential*, Eran Lebanon, P. Coleman, Invited talk at SCES 2007, Houston, Texas, *Physica B* 403, 1194-1198 (2008).
44. *Superconductivity due to co-operative Kondo effect in Pu 115's*, M. Dzero, P. Coleman, *Strongly Correlated Electrons, Physica B* 403, 955-957 (2008).
45. *Spectroscopic signatures of nonequilibrium pairing in atomic Fermi gases*, M. Dzero, E. A. Yuzbashyan, B. L. Altshuler, P. Coleman , *Phys. Rev. Lett.* 99, 160402 (2007).
46. *Title: Conductance of a spin-1 quantum dot: the two-stage Kondo effect*, Anna Posazhenikova , Babak Bayani and P. Coleman, *Phys. Rev. B* 75, 245329 (2007).
47. *Heavy Fermions: electrons at the edge of magnetism* P. Coleman, Volume 1, *Handbook of Magnetism and Advanced Magnetic Materials*, Edited by Helmut Kronmüller and Stuart Parkin. Vol 1: Fundamentals and Theory. John Wiley and Sons, 95-148 (2007).

48. *Fermi liquid identities for the Infinite U Anderson Model* Eran Lebanon, P. Coleman , *Phys. Rev. B* 76, 085117 (2007).
49. *Conserving many body approach to the fully screened, infinite U Anderson model*”, Eran Lebanon, Jerome Rech, P. Coleman, Olivier Parcollet, *Phys. Rev. Lett.* 97, 106604 (2006).
50. *“Theory Perspective: SCES ’05 Vienna”*, P. Coleman, *Physica B: Condensed Matter*, 378-380, 1160 (2006).
51. *“Schwinger Boson approach to the fully screened Kondo model.*, J. Rech, P. Coleman, O. Parcollet and G. Zarand, *Phys. Rev. Lett.* 96, 016601 (2006).
52. *“Frustration can not preserve a Quasi-Two-Dimensional Spin Fluid”*, M. Maltseva and P. Coleman,*Phys. Rev. B* 72, 174415-9 (2005).
53. *“Transport anomalies in a simplified model for a heavy electron quantum critical point”*, P. Coleman, A. Schofield and J. B. Marston, *Phys. Rev. B* 72, 245111 (2005).
54. *“Sum Rules and Ward Identities in the Kondo Lattice”*, P. Coleman, I. Paul and J. Rech, *Phys. Rev. B* 72, 094430 (2005).
55. *“Itinerancy and Hidden Order in URu2Si2”*, P. Chandra, P. Coleman and V. Tripathi, *J. Phys.: Condens. Matter* 17, 5285 (2005).
56. *“Non equilibrium noise as a probe of the Kondo effect in mesoscopic wires”*, Eran Lebanon and P. Coleman, *Phys. Rev. Lett.* 95, 046803 (2005).
57. *“Quantum Criticality”* Piers Coleman and Andrew J. Schofield, *Nature*, “Einstein Centenary Edition”, *Nature* vol 433, 226-229 (2005).
58. *“Anomalous conductance of a spin 1 quantum dot”*, A. Posazhennikova & P. Coleman, *Phys. Rev. Lett.* 94, 036802 (2005)
59. *“Singular Fermi Liquid fixed points in quantum impurity models”*, Pankaj Mehta, L. Borda, Gergely Zarand, Natan Andrei, P. Coleman, *Phys. Rev. B* 72, 014430 (2005).
60. *“Destruction of large Fermi surface at a heavy-fermion quantum critical point”*, S.Paschen, T. Lühmann, S. Wirth, P. Gegenwart, O. Trovarelli, Ch. Geibel, F. Steglich, P. Coleman and Q. Si, *Nature* 432, 881 - 885 (2004).
61. *“Frontiers in Correlated Matter”*, P. Coleman, *MRS Bulletin* **29**, 968-970 (2004).
62. *“Quantum replica approach to the under-screened Kondo model”*. P. Coleman & I. Paul. *Phys. Rev. B* **70**, 1 (2004).
63. *“Spin Dynamics from Majorana Fermions”*, W. Mao, P. Coleman, C. Hooley and D. Langreth, *Phys. Rev. Lett.* 91, 207203, (2003).

64. “*Many Body Physics: Unfinished Revolution*”, P. Coleman, *Ann Henri Poincare* 4, Suppl. 2 (2003) S559-S580.
65. “*Non-Fermi liquid behavior in the Under-Screened Kondo model*” P. Coleman and C. Pépin, *Physical Review B* 68 220405 (2003) RC.
66. *The Case for Phase Separation in URu₂Si₂*, P. Chandra, P. Coleman, J.A. Mydosh, V. Tripathi, *J. Phys. Cond. Mat.* 15, S1965-71 (2003).
67. “*Break up of the heavy electron at a quantum critical point*” J. Custers, P. Gegenwart, H. Wilhelm, K. Neumaier, Y. Tokiwa, O. Trovarelli, C. Geibel, F. Steglich, C. Pépin and P. Coleman, *Nature*, 424, 524-527 (2003).
68. “*Local moment physics in heavy electron systems*” P. Coleman, in *Lectures on the Physics of Highly Correlated Electron Systems VI: Sixth Training Course*, edited by F. Mancini, American Institute of Physics, (2002).
69. “*Breakdown of Fermi liquid theory in heavy fermion compounds*” C. Pépin and P. Coleman, *Proceedings of LT23 Hiroshima* (2002), *Physica* (2003).
70. “*Susy atomic model*” J. Hopkinson and P. Coleman, *Proceedings of the SCES 2002 conference*, *Acta Physica Polonica B*, 34, 733 (2003).
71. “*Heavy Electron Quantum Criticality*” P. Coleman and C. Pépin, *Proceedings of the SCES 2002 conference*, Kraków, Poland, *Acta Physica Polonica B* 34, 691-705, (2003).
72. *Hidden Order in URu₂Si₂: The Need for a Dual Description*, J. Mydosh, P. Chandra, P. Coleman and V. Tripathi, *Proceedings of the SCES 2002 conference Kraków, Poland*, (2002), *Acta Polonica* (2003).
73. *Quenched Disorder Formulation of the Pseudo-Gap Problem*, A. Posazhennikova and P. Coleman, *Phys. Rev. B* 67, 165109-1-12, (2003).
74. “*LiV₂O₄: frustration induced heavy fermion metal*”, J. Hopkinson and P. Coleman, *Phys. Rev. Lett* 89, 267201 (2002).
75. “*Atomic Model of Susy Hubbard Operators*”, J. Hopkinson and P. Coleman, *Phys. Rev. B*, 67, 085110 (2003).
76. “*Hidden Orbital Order in URu₂Si₂*”, P. Chandra, P. Coleman, J. Mydosh and V. Tripathi, *Nature* 417, 831-834 (2002).
77. “*Oscillatory Instabilities in DC biased quantum Dots*” P. Coleman, C. Hooley, A. F. Ho, Y. Avishai and Y. Goldin, *J. Phys.: Condens. Matter* 14 L205-L211, (2002).
78. “*Two stage screening model of LiV₂O₄*” J. Hopkinson and P. Coleman, *Physica B*, 312-313, 711-713 (2002).

79. “Pressure-Induced Magnetism and Hidden Order in URu_2Si_2 ” P. Chandra and P. Coleman, *Physica B* 312-313, 397-400, (2002).
80. “Supersymmetric approach to the infinite U Hubbard Model” P. Coleman and C. Pepin, *Physica B* 312-313, 539-541 (2002).
81. “What is the Fate of the heavy electron at a Quantum Critical Point?”, P. Coleman, C. Pepin, *Physica B* , 312-313, 383-389 (2002).
82. “Magnetic Spins that last For Ever” P. Coleman, Nature News and Views, *Nature*, **413**, 788-789, (2001).
83. “How do Fermi liquids get heavy, and die?”, P. Coleman, C. Pepin, Q. Si and R. Ramazashvili, *J. Cond Matt* **13**, R723 (2001).
84. “Two-channel Kondo Lattice Model on a ladder studied by the Density Matrix Renormalization Group Method”, Juana Moreno, Shaojin Qin and P. Coleman, *Phys. Rev. B***64**, 085116 (2001).
85. “Magnetic glue exposed”, Nature News and Views, *Nature* vol 410, 320-321, (2001)
86. “Is the quantum dot at large bias a weak-coupling problem?”, P. Coleman, C. Hooley and O. Parcollet, *Phys. Rev. Lett.* **86**, 4088 (2001).
87. “Supersymmetric Hubbard Operators” P. Coleman, C. Pépin and J. Hopkinson , *Phys. Rev. B* **63**, 140411(R) (2001).
88. “Strong coupling approach to the supersymmetric Kondo model” P. Coleman, C. Pépin, A. M. Tsvelik, *Nuclear Physics B***586**, 641-667, (2000).
89. “Hidden Order in URu_2Si_2 ” Nayana Shah, P. Chandra, P. Coleman and J.A. Mydosh, *Phys. Rev. B* **61**, 564 (2000)
90. “Supersymmetric Spin Operators” P. Coleman, C. Pépin, A. M. Tsvelik, *Phys. Rev. B*, **62**, 3852-3868 (2000).
91. “Onset of magnetism in heavy fermion metals” A. Schroeder, G. Aeppli, R. Coldea, M. Adams, O. Stockert, H. von Lohneyson, E. Bucher, R. Ramazashvili and P. Coleman, *Nature*, **407**, 351-355 (2000).
92. *Bound-State Instability of the Chiral Luttinger Liquid in One-Dimension.* A. F. Ho and P. Coleman, *Phys. Rev. B* **62**, 1688 (2000).
93. “Gap-anisotropic model for the narrow-gap Kondo insulators”, J. Moreno and P. Coleman, *Phys. Rev. Lett.* **84**, 342 (2000).

94. "Breakdown of the Chiral Luttinger Liquid in One-Dimension. ", A. F. Ho and P. Coleman, *Physical Review Letters*, **83**, 1383 (1999).
95. "Theories of non-Fermi liquid behavior", invited talk, P. Coleman, Proceedings of 1998 Strongly Correlated Electron Systems conference, Paris, *Physica B***259-261**, 353 (1999).
96. "Co-operative Kondo Effect in the two-channel Kondo Lattice", P. Coleman, A. M. Tsvelik, N. Andrei and H. Y. Kee, *Phys. Rev. B* **60**, 3608 (1999).
97. "Marginal Fermi Liquid in a Lattice of Three Body bound-states", *Phys. Rev. B*, **58**, 4418 (1998).
98. "Scaling of magnetic fluctuations near a quantum phase transition", A. Schroder, G. Aeppli, E. Bucher, R. Ramazashvili, P. Coleman *Phys. Rev. Lett.*, PRL 80, 5623 (1998).
99. "Superconductors gap out", Nature News and Views article, P. Coleman, March 14th (1998).
100. "Local Moments in an Interacting Environment", P. Coleman and A. M. Tsvelik, *Phys. Rev. B*, Vol. 57, 12757 (1998).
101. "Co-operative Two-Channel Kondo Effect", P. Coleman, A. M. Tsvelik, N. Andrei and H. Y. Kee, *J. Physics : Cond. Matt Letters*, Vol. 10, L239-245, (1998).
102. "Superconducting Quantum Critical Point" Revaz Ramazashvili and Piers Coleman, *Phys. Rev. Letters*, Vol. 79, 3752 (1997).
103. "f-sum rule for the optical Hall angle" P. Coleman and D. Drew, *Phys. Rev. Letters*, Vol. 78, 1572 (1997).
104. *Reflections on the one-dimension realization of odd-frequency pairing* P. Coleman, A. Georges and A. M. Tsvelik, *J. Phys: Cond Matt*, Vol 79, 345 (1997).
105. "How should we interpret the two transport relaxation times in the cuprates?" P. Coleman, A. J. Schofield and A. M. Tsvelik, *J. Physics (Cond Matt.)*, 8, 9985 (1996).
106. "Ultrasound attenuation in gap-anisotropic systems" J. Moreno and P. Coleman, *Phys. Rev B Rapid Comm*, **53**, R2995 (1996).
107. "Phenomenological Transport Equation for the Cuprate Superconductors" P. Coleman, A. Schofield and A. M. Tsvelik, *Phys. Rev. Lett* **76**, 1324 (1996).
108. "Condensed Matter Physics, the understated frontier", P. Coleman, *Physics World* Issue 12, 29 (1995).
109. "New Outlooks and Old Dreams in Quantum Antiferromagnets, " P. Chandra and P. Coleman in *Strongly Interacting Fermions and High Temperature Superconductivity: Les Houches Lecture Notes (Session LVI)*, ed. B. Doucot and J. Zinn-Justin, 495-594, (North-Holland, 1995)

110. “Simple description of the anisotropic two-channel Kondo model” P. Coleman and A. Schofield, *Phys. Rev. Lett*, **75**, 2184, (1995).
111. “Simple formulation of the two-channel Kondo model”, P.Coleman, L. Ioffe and A. M. Tsvelik, *Phys. Rev. B*, **52**, 6611 (1995).
112. “Three Body bound-states and the development of odd frequency pairing” P.Coleman, E. Miranda and A. Tsvelik, *Phys. Rev. Lett.* , **74**, 1654 (1995).
113. “Questions and Issues at SCES '94”, **Conference Theory Summary Talk** P. Coleman, *Physica B*, **210**, 191, (1995).
114. “Odd Frequency Pairing in Heavy Fermion Superconductors”, P. Coleman, E. Miranda and A. Tsvelik, *Physica B*, **206**, 628, (1995).
115. “Finite-Temperature Transition into a Power Law Spin Phase with an Extensive Zero Point Entropy”, P. Chandra, P. Coleman and L. Ioffe, *PRB*, **49**, 12897, (1994).
116. “Non Linear Susceptibility as a probe of the Quadrupolar Kondo Effect”, A. Ramirez, P. Chandra, P. Coleman, Z. Fisk, J. L. Smith and H. Ott, *Phys. Rev. Lett.*, **73**, 3018 (1994).
117. “Odd Frequency Pairing in the Kondo Lattice”, P. Coleman, E. Miranda and A. Tsvelik, *Phys. Rev. B.*, **49**, 8955, (1994).
118. “Non Linear Susceptibility measurements in Heavy Fermion systems”, P. Chandra, A. Ramirez, P. Coleman, E. Brück, A. A. Menovsky, Z. Fisk, & E. Bücher *Physica B*, **199-200**, 426 (1994).
119. “Instabilities of the Abrikosov Suhl Resonance”, P. Coleman, E. Miranda and A. Tsvelik, *Physica B*, **199-200**, 197(1994).
120. “Gutzwiller-Jastrow wave functions for the $1/r$ Hubbard Model”, D. F. Wang, Q. F. Zhong and P. Coleman, *Phys. Rev. B.* **48**, 5502 (1993).
121. “Spin Folding in The Two Dimensional Kagome Lattice Antiferromagnet”, I. Ritchey, P. Coleman and P. Chandra, *Phys. Rev. Rapid Comm.* **B 47**, 15342 (1993).
122. “Possible Realization of Odd Frequency Pairing in Heavy Fermion Superconductors”, E. Miranda, P. Coleman and A. Tsvelik, *Phys. Rev. Lett.* **70**, 2960 (1993).
123. “Perturbative Approach to the Non-Fermi-Liquid Fixed Point of the Overscreened Kondo Problem”, J. Gan, N. Andrei and P. Coleman, *Phys. Rev. Lett.* **70**, 686, (1993)
124. “The anisotropic Kagome Antiferromagnet: a topological spin glass?”, P. Chandra, P. Coleman and I. Ritchey, *Journal de Physique*, **3**, 591 (1993).
125. “Are Heavy Fermion Insulators Gapless ?”, P. Coleman, E. Miranda and A. Tsvelik, *Physica B* **186-188**, 362 (1993).

126. “Energy Spectrum of the One Dimensional Supersymmetric t - J model with Long Range hopping and Exchange”, D. Feng, J. T. Liu and P. Coleman, *Phys. Rev. B*, **46**, 6639 (1992)
127. “Coexistence of Fermi Liquid and Magnetism in the Underscreened Kondo Model”, J. Gan and P. Coleman, *Phys. Rev. Lett.* **68**, 3476, (1992)
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131. “Spin Waves in Doped Mott Insulators”, J. Gan, P. Coleman and N. Andrei, *J. Cond. Matt* **20**, 3396, (1991).
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135. “Quantum Spin Nematics: Moment Free Magnetism”, P. Coleman and P. Chandra, *Phys. Rev. Lett.* **66**, 100 (1991).
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137. “Quantum fluids approach to Frustrated Heisenberg Models”, P. Chandra , P. Coleman & A. I. Larkin, *Journal of Condensed Matter Physics*, **2** 7933, (1990).
138. “Ising Phase Transition in Frustrated Heisenberg Models”, P. Chandra, P. Coleman and A. Larkin, *Phys. Rev. Lett.* **64**, 88 (1990).
139. “Twisted Magnets & Twisted Superfluids”, P. Coleman & P. Chandra, *Int. J. Mod. Phys. B*, 1729 (1989).
140. “Some new perspectives on Quantum Antiferromagnets”, “Wohlfarth Memorial Lecture”, *J.M.M.M.***82**, 159 (1989).

141. “Kondo stabilized spin liquids and heavy fermion superconductivity”, P. Coleman and N. Andrei, J. Phys. Cond. Matt. **C 1**, 4057-4080 (1989).
142. “Cooper instability in the presence of a spin liquid”, N. Andrei and P. Coleman, Phys. Rev. Lett. **62**, 595 (1989).
143. “SU(2) spin liquids and heavy fermion superconductivity, P. Coleman and N. Andrei, J.M.M.M. **66 & 67**, 504 (1988).
144. “Dynamical Magnetic Fluctuations in Narrow Band Metals”, P. Coleman and G. G. Lonzarich, Proc. Narrow Band Workshop, Staverden, Nederland, Ed. J. Fuggle (Plenum 1988).
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146. “Electron Transport in Mixed Valence and Heavy Fermion Metals”, P. Coleman, Proc. 5th International Conference on Valence Fluctuations, Bangalore, 1987, Plenum (1988).
147. “Constrained Quasiparticles and conduction in heavy fermion systems”, P. Coleman, Phys. Rev. Lett. **59**, 1026 (1987).
148. “Fluctuations and Dissipation in the Kondo Lattice”, P. Coleman, Proc. 5th International Conference on Actinides and Rare Earth Alloys, J. Magn. & Magn. Mat. **63 & 64**, 245 (1987).
149. “Mixed Valence as an Almost Broken Symmetry”, P. Coleman, Phys. Rev. **B 35**, 5072-1186 (1987).
150. “Diagonalization of Generalized Anderson Model”, P. Coleman and N. Andrei, J. Phys. **C 19**, 3211 (1986).
151. “Broken Symmetry, Heavy Band Formation and the Generalized Anderson Model”, Proc. 5th International Conference on Crystalline Fields and Anomalous Mixing Effects, Sendai, Japan 1985, J. Mag. Mat. 1985.
152. “Modelling Mixed Valence Using the Generalized Anderson Model”, P. Coleman, Proc. 8th Taniguchi Symposium on Mixed Valence, Kashikojima, Japan 1985. (Springer Verlag) Ed. T. Kasuya, 1985, Springer Series in Solid State Physics, Vol. 62, p.163.
153. “Theory of Anomalous Hall effect in Mixed Valence Systems”, P. Coleman, P.W. Anderson and T.V. Ramakrishnan, Phys. Rev. Lett. **55**, 414 (1985).
154. “Anomalous Hall Effect in Kondo and Mixed Valence Systems”, T.V. Ramakrishnan, P. Coleman and P.W. Anderson, Proc. 4th Int. Conf. on Valence Fluctuations, Cologne 1984, J. Magn. and Magn. Mat. **47 & 48**, 493 (1985). (Invited talk)

155. "*Large N as a Classical Limit of Mixed Valence*" , P. Coleman, Proc. 4th International Conference on Valence Fluctuations, Cologne 1984, J. Magn. and Magn. Mat. **47 & 48**, 323 (1985). (Invited talk)
156. "*New Approach to the Mixed Valence Problem*", P. Coleman, Phys. Rev. **B 29**, 3035 (1984).
157. "*Mixed Valence: a new formulation*", P. Coleman, Proc. 1983 NATO Summer School in "Moment formation in Solids", (Plenum 1985) Ed. W. Buyers, p.279.
158. "*1/ N Expansion for the Kondo Lattice*", P. Coleman, Phys. Rev. **B 28**, 5255 (1983).

Invited Talks , lectures etc. 2001-

2013 Sep QCET, Freudenstadt Germany, Invited Talk
2013 Sep Higgs Center, Edinburgh, Topological quantum matter, invited talk
2013 Aug Nordita, Stockholm, SC, the second Century“ Invited Talk
2013 Aug SCES 2013, Semi plenary Invited Talk
2013 Aug ICAM-China Summer School, Weihei, China 2 lectures
2013 Jul Aspen Center for Physics, Blackboard talk
2013 Jun Royal Holloway Univ. London, Seminar
2013 May Los Alamos National Laboratory, Colloquium
2013 May CBPF, Rio de Janeiro, Brazil, Colloquium
2013 May Unicamp, Campinas, Brazil, Seminar
2013 Apr ICAM FAPERJ School, Rio de Janeiro, 3 Lectures
2013 Apr Kent University, Canterbury, UK, Colloquium
2013 Mar KIT, Karlsruhe, Seminar
2013 Mar AAAS Meeting, Boston, Invited Talk
2013 Jan TU, Vienna, Seminar
2013 Jan PSI, Zurich, Colloquium
2013 Jan MANEP Winter Schook, Saas-Fe Switzerland, 3 Lectures

2012 Dec Johns Hopkins U, Seminar
2012 Dec Ohio State U, Colloquium and Seminar
2012 Nov Boston College, Boston, Condensed Matter Seminar
2012 Oct IBM Almaden, Superconductivity 298K, invited talk
2012 Oct KITP UC Santa Barbara, Workshop on Frustrated Magnetism, Invited talk
2012 Aug Quantum Criticality and Novel Phases 12, Dresden, Invited Talk
2012 Aug Department of Energy PI Meeting, Plenary talk
2012 Aug ICTP Trieste, Italy, Invited Talk
2012 Jul M2S Washington, Plenary Outreach Lecture
2012 Jul U. South Carolina, 3 Lectures Summer School
2012 Jul Aspen Center for Physics, Blackboard talk
2012 Jul SCES 2012, Busan, Korea, Semi-Plenary Talk
2012 Jun Oxford, Sir Rudolf Peierls Theory Centre, Colloquium
2012 Jun Oxford, Clarendon Laboratory Colloquium
2013 Jun U. Stuttgart, Colloquium
2012 Jun Queen Mary College, London, Public Outreach Lecture
2012 Apr UCL, London, Seminar
2012 Apr Karlsruhe, Peter Wolffe FestSchrift, Invited Speaker
2012 Mar Berlin, DPG Spring Meeting, Invited Lecturer
2012 Mar Boston, APS March Meeting, Invited Speaker

2012 Feb UCLA, Colloquium
 2012 Jan Argonne National Lab, Colloquium
 2012 Jan IOP, Beijing, China, invited speaker

2011 Oct Univ Wuerzburg, School on Nanophysics, two lectures
 2011 Sept Princeton U, Invited Talk, PCTS Haldane 60th Birthday
 2011 Sept U.C. Davis, Colloquium, "Magnetism and Superconductivity: A new era of convergence."
 2011 June Colloq, MPIKS, Dresden "Magnetism and Superconductivity: A new era of convergence."
 2011 July Dialog on Physics, Aspen Colorado, "From the Quantum to the Micron"
 2011 May Royal Holloway, University of London, Colloquium
 2011 May International Institute for Theoretical Physics, Natal, Brazil, Invited Speaker
 2011 May Rutgers Stat Mech meet, Invited speaker
 2011 Apr Hangzhou, China Conference on Quantum Matter, Invited Speaker
 2011 Feb Louisiana State U, Invited Colloquium and Seminar

2010 Dec Mysore India, ICTS School on Condensed Matter, Lecturer, Five Lectures.
 2010 Dec Lev Gor'kov Fest, NHMFL, Tallahassee Florida, Invited Speaker
 2010 Nov McMaster U, Canada, Seminar
 2010 Oct CIFAR, Whistler, British Columbia, Canada, Invited Speaker
 2010 Jul Rutherford Lab, UK. Seminar
 2010 Jun SCES 2010, Santa Fe, NM. Invited Talk
 2010 Jun ICAM/FAPERJ Summer School, Rio de Janeiro, Brazil. Three lectures
 2010 Apr U. Maryland, Colloquium.
 2010 Mar APS March Meeting, Portland Oregon. Invited Talk
 2010 Feb ISSP Japan, Seminar.
 2010 Feb IIT Kanpur, India Invited Talk and Colloquium 50th Anniversary of IIT Kanpur

2009 Nov Seminar, Riken, Tokyo Japan.
 2009 Nov Colloquium and seminar ISSP, Tokyo Japan.
 2009 Oct Seminar, Doniach Fest, Stanford
 2009 Oct Invited Talk, Hangzhou, China.
 2009 Sept Colloquium, U. Toronto, Canada.
 2009 Aug Panel discussion leader, QCNP workshop, Dresden, Germany
 2009 July Colloquium, ILL, Grenoble, France.
 2009 July Two lectures, Cargese Summer School, Cargese France.
 2009 May Seminar, Amherst College.
 2009 April Keynote Speaker, Perimeter Institute CMP workshop.
 2008 April Colloquium, Perimeter Institute, Waterloo, Canada
 2009 April Colloquium, U. Toronto, Canada
 2009 Jan Colloquium, Technical U. Vienna, Austria

2009 Jan Colloquium, MPICFS, Dresden
 2009 Jan Invited Talk, Quantum Critical Phenomena in Superclean Materials, Hawaii
 2008 Oct Seminar, Brookhaven National Labs
 2008 Oct Colloquium, SUNY, Stony Brook
 2008 Sept Invited talk, PITP workshop on quantum criticality, Toronto
 2008 Aug Plenary Talk, SCES 2008, Buzios, Brazil
 2008 July Boulder Summer School, Three Lectures
 2008 June Colloquium, Max Planck Inst fur Complexer System, Dresden
 2008 June Seminar, Max Planck Inst fur Complexer System, Dresden
 2008 April Colloquium, Los Alamos National Lab, NM
 2008 April Colloquium, U Colorado, Bolder
 2008 Mar Seminar, Yale University
 2008 Mar Seminar, Unicamp, Campinas, Brazil
 2008 Feb Seminar, Boston U.
 2008 Jan Seminar, NYU
 2008 Jan Seminar, Royal Holloway, University London

2007 Dec Invited talk, Hong Kong University
 2007 Nov Invited Talk, Santa Fe workshop on heavy fermions
 2007 Oct Seminar, Univ Texas, Austin
 2007 Aug Seminar, Aspen Center for Physics
 2007 June Seminar, St. Andrews University, Scotland
 2007 June Seminar, London Center for NanoTechnology
 2007 June Seminar, Landau Institute, Moscow
 2007 May Invited talk by Postdoc Eran Lebanon, Houston SCES 2008
 2007 April Colloquium, University of Illinois, Urbana
 2007 April Seminar, Johns Hopkins University
 2007 Mar Three lectures, CBPQ, Rio de Janeiro,
 2007 Mar Seminar, Unicamp, Campinas, Brazil
 2007 Jan Seminar, Budapest Technical University

2006 Nov ACTP conference on correlated matter, Pohang, Korea. Invited Speaker.
 2006 Oct Harvard, Cambridge US. Seminar.
 2006 Oct Canadian Institute for Advanced Research, Vancouver, Canada. Invited Speaker.
 2006 Sept Florida State University, Tallahassee, Colloquium.
 2006 Aug Lorentz Institute, Leiden, NL. Invited Speaker.
 2006 Jun Lonzarich 60th Birthday Festschrift, Cambridge, UK. Invited Speaker .
 2006 Jun Rencontres Claudes Istzycson, Saclay, France. Invited Speaker.
 2006 Apr Colloquium, University of Florida, Gainesville.
 2005 Oct Invited Talk, Conference on Strongly correlated electrons, Hvar, Croatia.
 2005 Aug ICAM summer school lecturer, Cargese, Corsica, France

2005 Jul Conference Summary, SCES 2005, Vienna, Austria
 2005 Apr Seminar, UCLA
 2005 Mar Seminar, UCL London.
 2005 Jan Directors Lunchtime Seminar, KITP, UCSB, Santa Barbara
 2005 Jan Colloquium, UC Irvine

2004 Dec Seminar, Technical U. Budapest
 2004 Nov Colloquium, UIC, Chicago
 2004 Oct Colloquium, UNC Chapel Hill
 2004 Jul Invited speaker, CMD20, Prague
 2004 Jul Invited talk, ICTP Trieste, Italy
 2004 May Seminar, Inst. for Solid State, Budapest
 2004 May Invited talk, ICAM conference Cargese
 2004 May Colloquium, Argonne National Lab
 2004 Feb Seminar UC San Diego

2003 Nov Seminar, NHMFL, Los Alamos
 2003 Dec Colloq, U. Penn
 2003 Nov Colloq Northwestern University
 2003 Dec Colloq, Temple U
 2003 Jul Physics Dialog, Aspen
 2003 Jun Seminar, Karlsruhe,
 2003 Jun Seminar, Max Planck, Dresden
 2003 May Ehrenfest Colloquium, Leiden.
 2003 Jan Seminar, U. College, London

2002 Dec Colloquium, Jefferson Lab, Virginia
 2002 Nov Lecturer, Emergent Materials, Brazilia, Brazil
 2002 Oct Seminar, U. Michigan
 2002 Sep Invited Speaker Concepts in Strong Correlation 02, Hvar, Croatia
 2002 Aug Colloquium, UT Knoxville
 2002 Jul Invited Speaker, Th2002, Paris.
 2002 Jul Invited Speaker, Actinide Physics, Czech Republic
 2002 Jul Invited Speaker, ICM Poznan, Poland
 2002 Jun Visitor, UT Knoxville, / ORNL .
 2002 Jun Invited Speaker, musR 2000, Williamsburg
 2002 May ICAM lecturer, Los Alamos, NM
 2002 Apr Colloquium, Kent St. University
 2002 Mar Invited Speaker, APS March meeting, Indianapolis
 2002 Jan U. Toronto, Canada

2001 Dec ISIS, Rutherford Lab, UK.
2001 Dec LVSM , Katholeike U., Leuven, Colloquium.
2001 Dec Max Planck Inst, Dresden, Seminar
2001 Oct Board of Physics Meeting, National Science Council, Irvine Cal. Invited Speaker.
2001 Oct High Fields Conference, Santa Fe, NM, Invited Speaker.
2001 Oct Lecturer at 7th School of CMT, Vietri Sur Mare, Salerno.
2001 Sept Seminar, NHMFL, Tallahassee, Fl.
2001 Aug SCES 01, Ann Arbor, Invited Speaker
2001 May SpHT, Saclay, Seminar.
2001 May Festschrift Fur Frank Steglich, Schloss Ringberg, Germany, Invited Speaker
2001 Apr SNS Conference, Chicago, Invited Speaker
2001 Mar Boston College, Invited talk at workshop