

COLEMAN, Piers

**Condensed Matter (Theory)**

Professor, Rutgers University.

Nationality: UK/US Citizen

**Education:**

|                             |      |
|-----------------------------|------|
| B.A., Cambridge University  | 1979 |
| Ph.D., Princeton University | 1984 |

**Positions :**

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

**Grants and Fellowships:**

|   |           |           |
|---|-----------|-----------|
| DOE Grant "Spin driven phenomena in Strongly Correlated Materials." | \$390,000 | 2009-2011 |
| N.S.F. Grant "Local Moment and Heavy Fermion Physics"               | \$450,000 | 2006-2009 |
| I2CAM International Materials Institute                             | \$ 3.3M   | 2004-2009 |

**Visiting positions, awards etc.**

|   |              |
|---|--------------|
| Co-organizer 2008 NSF Boulder summer school                 |              |
| Member, Editorial board, Reports on Progress in Physics     | 2007-        |
| Organizer, I2CAM FAPERJ school, Rio de Janeiro,             | 2007         |
| Organizer, Trieste Miniworkshop on Strongly Correlation     | 1992- 2008   |
| Member APS Panel on Public Affairs,                         | 2007-        |
| Executive Committee, Institute for Complex Adaptive Matter  | 2006 -       |
| Steering committee, UK "Portfolio research Partnership".    | 2005 -2008   |
| International Advisory committee, SCES 05, Vienna           | 2005 Jul     |
| Organizer, KITP, Workshop on Quantum Phase Transitions.     | 2005 Jan-Apr |
| Organizer, "Frontiers in Correlated Matter" Aspen Snowmass. | 2004 Aug     |
| Advisory committee, SCES 04, Karlsruhe                      | 2004 Aug     |
| Organizer, ICAM conf "Quantum Criticality", Columbia U.     | 2003 March   |
| Fellow, American Physics Society,                           | 2000-        |
| US Editor, Journal of Physics, Condensed Matter             | 1999-2000    |
| Fellow, Institute of Physics, UK                            | 1999-        |
| Advisory committee, SCES 98, Paris, France                  | 1998 Aug     |

|  |               |
|--|---------------|
| Organizer, ITP, Santa Barbara Workshop on Non Fermi Liquids. | 1996 Jan-June |
| Advisory committee, SCES 94, Amsterdam, Holland              | 1994 Aug      |
| Lecturer du Troisieme Cycle, U. Lausanne, Switzerland        | 1991 Dec      |
| 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      |
| Research Visitor, Landau Inst. , Moscow, USSR.               | 1989 Oct      |
| First Wohlfarth Memorial Lecture, Imperial College, UK.      | 1989 Apr      |
| Participant, US-Soviet Academy scientific exchange, USSR.    | 1988 Oct      |

### Publications:

1. “*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, submitted to Proceedings of the National Academy of Sciences (2009).
2. “*Coherence factors in a high- $T_c$  cuprate probed by quasi-particle scattering off vortices*”, T. Hanaguri, Y. Kohsaka, M. Ono, M. Maltseva, P. Coleman, I. Yamada, M. Azuma, M. Takano, K. Ohishi, H. Takagi, Science, vol. 323, pp. 923-926 (2009).
3. “*Lending an iron hand to spintronics*”, P. Coleman, Physics, Jan 20th, 2009, <http://physics.aps.org/articles/v2/6>.
4. “*Symplectic  $N$  and time reversal in frustrated magnetism*” , Rebecca Flint and P. Coleman, Physical Review B 79, 014424 (2009).
5. “*Heavy fermion behaviour in  $\beta$ -YbAlB<sub>4</sub>: insight from band theory*”, Andriy H. Nevidomskyy and P. Coleman, Phys. Rev. Lett. 102, 077202 (2009).
6. *Coherence factors in a high- $T_c$  cuprate probed by quasi-particle scattering off vortices*, T. Hanaguir, Y. Kohsaka, M. Ono, M. Maltseva, P. Coleman, I. Yamada, M. Azuma, M. Takano, K. Ohishi and H. Takagi, submitted for publication, (2008).
7. “*Intinerant Ferromagnetism in an Atom Trap.*” Ilya Berndnikov, P. Coleman and S. Simon, submitted to Physical Review Letters (2008).
8. *Heavy electrons and the symplectic symmetry of the electron spin*, Rebecca Flint, M. Dzero, P. Coleman, Nature Physics 4, 643 - 648 (2008).
9. *Quantum Critical Paraelectrics and the Casimir Effect in Time*, L. Pálová, P. Chandra and P. Coleman, submitted to PRB (2008).
10. *Angle dependent quasiparticle weights in correlated metals* Pouyan Ghaemi, T. Senthil, P. Coleman, Phys. Rev. B 77, 245108 (2008).

11. *Frontier at your fingertips* P. Coleman, Nature Connections Article, Nature 446, 379 (22 March 2007).
12. *Sleuthing Hidden Order*, V. Tripathi, P. Chandra, P. Coleman, Nature Physics 3, 78-80 (2007).
13. *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).
14. *Superconductivity due to co-operative Kondo effect in Pu 115's*, M. Dzero, P. Coleman, Strongly Correlated Electrons, Physica **B** 403, 955-957 (2008).
15. *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).
16. *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).
17. *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).
18. *Fermi liquid identities for the Infinite U Anderson Model* Eran Lebanon, P. Coleman, Phys. Rev. B 76, 085117 (2007).
19. *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).
20. *"Theory Perspective: SCES '05 Vienna"*, P. Coleman, Physica B: Condensed Matter, 378-380, 1160 (2006).
21. *"Schwinger Boson approach to the fully screened Kondo model"*, J. Rech, P. Coleman, O. Parcollet and G. Zarand, Phys. Rev. Lett. 96, 016601 (2006).
22. *"Frustration can not preserve a Quasi-Two-Dimensional Spin Fluid"*, M. Maltseva and P. Coleman, Phys. Rev. B 72, 174415-9 (2005).
23. *"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).
24. *"Sum Rules and Ward Identities in the Kondo Lattice"*, P. Coleman, I. Paul and J. Rech, Phys. Rev. B 72, 094430 (2005).
25. *"Itinerancy and Hidden Order in URu2Si2"*, P. Chandra, P. Coleman and V. Tripathi, J. Phys.: Condens. Matter 17, 5285 (2005).

26. “*Non equilibrium noise as a probe of the Kondo effect in mesoscopic wires*”, Eran Lebanon and P. Coleman, Phys. Rev. Lett. 95, 046803 (2005).
27. “*Quantum Criticality*” Piers Coleman and Andrew J. Schofield, Nature, “Einstein Centenary Edition”, Nature vol 433, 226-229 (2005).
28. “*Anomalous conductance of a spin 1 quantum dot*”, A. Posazhennikova & P. Coleman, Phys. Rev. Lett. 94, 036802 (2005)
29. “*Singular Fermi Liquid fixed points in quantum impurity models*”, Pankaj Mehta, L. Borda, Gergely Zarand, Natan Andrei, P. Coleman, Phys. Rev. B, Phys. Rev. B 72, 014430 (2005).
30. “*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).
31. “*Frontiers in Correlated Matter*”, P. Coleman, MRS Bulletin **29**, 968-970 (2004).
32. “*Quantum replica approach to the under-screened Kondo model*”. P. Coleman & I. Paul. Phys. Rev. B **70**, 1 (2004).
33. “*Spin Dynamics from Majorana Fermions*”, W. Mao, P. Coleman, C. Hooley and D. Langreth, Phys. Rev. Lett. 91, 207203, (2003).
34. “*Many Body Physics: Unfinished Revolution*”, P. Coleman, Ann Henri Poincare 4, Suppl. 2 (2003) S559-S580.
35. “*Non-Fermi liquid behavior in the Under-Screened Kondo model*” P. Coleman and C. Pépin, Physical Review B 68 220405 (2003) RC.
36. *The Case for Phase Separation in URu<sub>2</sub>Si<sub>2</sub>*, P. Chandra, P. Coleman, J.A. Mydosh, V. Tripathi, J. Phys. Cond. Mat. 15, S1965-71 (2003).
37. “*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).
38. “*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).
39. “*Breakdown of Fermi liquid theory in heavy fermion compounds*” C. Pépin and P. Coleman, Proceedings of LT23 Hiroshima (2002), Physica (2003).
40. “*Susy atomic model*” J. Hopkinson and P. Coleman, Proceedings of the SCES 2002 conference, Acta Physica Polonica B, 34, 733 (2003).

41. “*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).
42. Hidden Order in  $URu_2Si_2$ : 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).
43. Quenched Disorder Formulation of the Pseudo-Gap Problem, A. Posazhennikova and P. Coleman, Phys. Rev. B **67**, 165109-1-12, (2003).
44. “ $LiV_2O_4$ : frustration induced heavy fermion metal”, J. Hopkinson and P. Coleman, Phys. Rev. Lett **89**, 267201 (2002).
45. “Atomic Model of Susy Hubbard Operators”, J. Hopkinson and P. Coleman, Phys. Rev. B, **67**, 085110 (2003).
46. “*Hidden Orbital Order in  $URu_2Si_2$* ”, P. Chandra, P. Coleman, J. Mydosh and V. Tripathi, Nature **417**, 831-834 (2002).
47. “*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).
48. “*Two stage screening model of  $LiV_2O_4$* ” J. Hopkinson and P. Coleman, Physica B, 312-313, 711-713 (2002).
49. “*Pressure-Induced Magnetism and Hidden Order in  $URu_2Si_2$* ” P. Chandra and P. Coleman, Physica B 312-313, 397-400, (2002).
50. “*Supersymmetric approach to the infinite  $U$  Hubbard Model*” P. Coleman and C. Pepin, Physica B 312-313, 539-541 (2002).
51. “*What is the Fate of the heavy electron at a Quantum Critical Point?*”, P. Coleman, C. Pepin, Physica B , 312-313, 383-389 (2002).
52. “*Magnetic Spins that last For Ever*” P. Coleman, Nature News and Views, Nature, **413**, 788-789, (2001).
53. “*How do Fermi liquids get heavy, and die?*”, P. Coleman, C. Pepin, Q. Si and R. Ramazashvili, J. Cond Matt **13**, R723 (2001).
54. “*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).
55. “*Magnetic glue exposed*”, Nature News and Views, Nature vol 410, 320-321, (2001)

56. “*Is the quantum dot at large bias a weak-coupling problem?*”, P. Coleman, C. Hooley and O. Parcollet, Phys. Rev. Lett. 86, 4088 (2001).
57. “*Supersymmetric Hubbard Operators*” P. Coleman, C. Pépin and J. Hopkinson , Phys. Rev. **B 63**, 140411(R) (2001).
58. “*Strong coupling approach to the supersymmetric Kondo model*” P. Coleman, C. Pépin, A. M. Tsvelik, Nuclear Physics B586, 641-667, (2000).
59. “*Hidden Order in URu<sub>2</sub>Si<sub>2</sub>*” Nayana Shah, P. Chandra, P. Coleman and J.A. Mydosh, Phys. Rev. **B 61**, 564 (2000)
60. “*Supersymmetric Spin Operators*” P. Coleman, C. Pépin, A. M. Tsvelik, Phys. Rev. B, 62, 3852-3868 (2000).
61. “*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).
62. *Bound-State Instability of the Chiral Luttinger Liquid in One-Dimension.* A. F. Ho and P. Coleman, Phys. Rev. **B 62**, 1688 (2000).
63. “*Gap-anisotropic model for the narrow-gap Kondo insulators*”, J. Moreno and P. Coleman, Phys. Rev. Lett. **84**, 342 (2000).
64. “*Breakdown of the Chiral Luttinger Liquid in One-Dimension.* ”, A. F. Ho and P. Coleman, Physical Review Letters, **83**, 1383 (1999).
65. “*Theories of non-Fermi liquid behavior*”, invited talk, P. Coleman, Proceedings of 1998 Strongly Correlated Electron Systems conference, Paris, Physica **B259-261**, 353 (1999).
66. “*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).
67. “*Marginal Fermi Liquid in a Lattice of Three Body bound-states*”, Phys. Rev. B, **58**, 4418 (1998).
68. “*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).
69. “*Superconductors gap out*”, Nature News and Views article, P. Coleman, March 14th (1998).
70. “*Local Moments in an Interacting Environment*” P. Coleman and A. M. Tsvelik, Phys. Rev. B, Vol. 57, 12757 (1998).
71. “*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).

72. “*Superconducting Quantum Critical Point*” Revaz Ramazashvili and Piers Coleman, *Phys. Rev. Letters*, Vol. 79, 3752 (1997).
73. “*f-sum rule for the optical Hall angle*” P. Coleman and D. Drew, *Phys. Rev. Letters*, Vol. 78, 1572 (1997).
74. *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).
75. “*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).
76. “*Ultrasound attenuation in gap-anisotropic systems*” J. Moreno and P. Coleman, *Phys. Rev B Rapid Comm*, **53**, R2995 (1996).
77. “*Phenomenological Transport Equation for the Cuprate Superconductors*” P. Coleman, A. Schofield and A. M. Tsvelik, *Phys. Rev. Lett* **76**, 1324 (1996).
78. “*Condensed Matter Physics, the understated frontier*”, P. Coleman, *Physics World* Issue 12, 29 (1995).
79. “*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)
80. “*Simple description of the anisotropic two-channel Kondo model*” P. Coleman and A. Schofield, *Phys. Rev. Lett*, 75, 2184, (1995).
81. “*Simple formulation of the two-channel Kondo model*”, P. Coleman, L. Ioffe and A. M. Tsvelik, *Phys. Rev. B*, 52, 6611 (1995).
82. “*Three Body bound-states and the development of odd frequency pairing*” P. Coleman, E. Miranda and A. Tsvelik, *Phys. Rev. Lett.* , 74, 1654 (1995).
83. “*Questions and Issues at SCES '94*”, **Conference Theory Summary Talk** P. Coleman, *Physica B*, 210, 191, (1995).
84. “*Odd Frequency Pairing in Heavy Fermion Superconductors*”, P. Coleman, E. Miranda and A. Tsvelik, *Physica B*, 206, 628, (1995).
85. “*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).
86. “*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).

87. “*Odd Frequency Pairing in the Kondo Lattice*”, P. Coleman, E. Miranda and A. Tsvelik, *Phys. Rev. B.*, **49**, 8955, (1994).
88. “*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).
89. “*Instabilities of the Abrikosov Suhl Resonance*”, P. Coleman, E. Miranda and A. Tsvelik, *Physica B*, **199-200**, 197(1994).
90. “*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).
91. “*Spin Folding in The Two Dimensional Kagome Lattice Antiferromagnet*”, I. Ritchey, P. Coleman and P. Chandra, *Phys. Rev. Rapid Comm.* **B 47**, 15342 (1993).
92. “*Possible Realization of Odd Frequency Pairing in Heavy Fermion Superconductors*”, E. Miranda, P. Coleman and A. Tsvelik, *Phys. Rev. Lett.* **70**, 2960 (1993).
93. “*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)
94. “*The anisotropic Kagome Antiferromagnet: a topological spin glass?*”, P. Chandra, P. Coleman and I. Ritchey, *Journal de Physique*, **3**, 591 (1993).
95. “*Are Heavy Fermion Insulators Gapless ?*”, P. Coleman, E. Miranda and A. Tsvelik, *Physica B* **186-188**, 362 (1993).
96. “*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)
97. “*Coexistence of Fermi Liquid and Magnetism in the Underscreened Kondo Model*”, J. Gan and P. Coleman, *Phys. Rev. Lett.* **68**, 3476, (1992)
98. “*Non Linear Susceptibility as a Probe of Tensor Spin Order*”, A. Ramirez, P. Coleman, P. Chandra, A. Menovsky, E. Brück, Z. Fisk and E. Bücher, *Physical Review Letters*, **68**, 2680, (1992).
99. “*Heavy Fermion Physics: Physics on the Brink of Magnetism*”, P. Coleman, Kathmandu Summer School 1991 Lectures, to be published (World Scientific)
100. “*Charge Kondo Effect in negative  $U$  Anderson Model*”, A. Taraphder and P. Coleman, *Physical Review Letters* **66**, 2814, (1991).
101. “*Spin Waves in Doped Mott Insulators*”, J. Gan, P. Coleman and N. Andrei, *J. Cond. Matt* **20**, 3396, (1991).

102. “*Micromagnetism in heavy Fermion Compounds*”, J. Gan and P. Coleman, *Physica B*, **171**, 3 (1991).
103. “*Quantum fluids treatment of the Triangular Heisenberg Model*”, I. Ritchey and P. Coleman, *J. Cond Matt Lett*, (1990).
104. “*Quantum Spin Nematics: Moment Free Magnetism*”, P. Coleman and P. Chandra, *Phys. Rev. Lett.* **66**, 100 (1991).
105. “*Chiral Spin Fluctuations: Long versus short wavelength*”, I. Ritchey, P. Chandra and P. Coleman, *Phys. Rev. Lett.* **64**, 2583(1990).
106. “*Quantum fluids approach to Frustrated Heisenberg Models*”, P. Chandra , P. Coleman & A. I. Larkin, *Journal of Condensed Matter Physics*, **2** 7933, (1990).
107. “*Ising Phase Transition in Frustrated Heisenberg Models*”, P. Chandra, P. Coleman and A. Larkin, *Phys. Rev. Lett.* **64**, 88 (1990).
108. “*Twisted Magnets & Twisted Superfluids*”, P. Coleman & P. Chandra, *Int. J. Mod. Phys. B*, 1729 (1989).
109. “*Some new perspectives on Quantum Antiferromagnets*”, “Wohlfarth Memorial Lecture”, *J.M.M.M.***82**, 159 (1989).
110. “*Kondo stabilized spin liquids and heavy fermion superconductivity*”, P. Coleman and N. Andrei, *J. Phys. Cond. Matt.* **C 1**, 4057-4080 (1989).
111. “*Cooper instability in the presence of a spin liquid*”, N. Andrei and P. Coleman, *Phys. Rev. Lett.* **62**, 595 (1989).
112. “*SU(2) spin liquids and heavy fermion superconductivity*, P. Coleman and N. Andrei, *J.M.M.M.* **66 & 67**, 504 (1988).
113. “*Dynamical Magnetic Fluctuations in Narrow Band Metals*”, P. Coleman and G. G. Lonzarich, *Proc. Narrow Band Workshop, Staverden, Nederland*, Ed. J. Fuggle (Plenum 1988).
114. “*Slave Boson Methods*”, P. Coleman, *Proc. 1987 CAP/NSERC Summer Inst. in Theoretical Physics, Edmonton, Alberta (North Holland)* Ed. F. C. Khanna, et. al. World Scientific (1988).
115. “*Electron Transport in Mixed Valence and Heavy Fermion Metals*”, P. Coleman, *Proc. 5th International Conference on Valence Fluctuations, Bangalore, 1987*, Plenum (1988).
116. “*Constrained Quasiparticles and conduction in heavy fermion systems*”, P. Coleman, *Phys. Rev. Lett.* **59**, 1026 (1987).

117. "*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).
118. "*Mixed Valence as an Almost Broken Symmetry*", P. Coleman, Phys. Rev. **B 35**, 5072-1186 (1987).
119. "*Diagonalization of Generalized Anderson Model*", P. Coleman and N. Andrei, J. Phys. **C 19**, 3211 (1986).
120. "*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.
121. "*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.
122. "*Theory of Anomalous Hall effect in Mixed Valence Systems*", P. Coleman, P.W. Anderson and T.V. Ramakrishnan, Phys. Rev. Lett. **55**, 414 (1985).
123. "*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)
124. "*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)
125. "*New Approach to the Mixed Valence Problem*", P. Coleman, Phys. Rev. **B 29**, 3035 (1984).
126. "*Mixed Valence: a new formulation*", P. Coleman, Proc. 1983 NATO Summer School in "Moment formation in Solids", (Plenum 1985) Ed. W. Buyers, p.279.
127. "*1/N Expansion for the Kondo Lattice*", P. Coleman, Phys. Rev. **B 28**, 5255 (1983).

Invited Talks , lectures etc. 2001-

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

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

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

2004 Feb Seminar UC San Diego  
2004 May Colloquium, Argonne National Lab

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

2005 Jan Colloquium, UC Irvine  
 2005 Jan Directors Lunchtime Seminar, KITP, UCSB, Santa Barbara  
 2005 Mar Seminar, UCL London.  
 2005 Apr Seminar, UCLA  
 2005 Jul Conference Summary, SCES 2005, Vienna, Austria  
 2005 Aug ICAM summer school lecturer, Cargese, Corsica, France  
 2005 Oct Invited Talk, Conference on Strongly correlated electrons, Hvar, Croatia.  
 2006 Apr Colloquium, University of Florida, Gainesville.  
 2006 Jun Rencontres Claudes Istzycson, Saclay, France. Invited Speaker.  
 2006 Jun Lonzarich 60th Birthday Festschrift, Cambridge, UK. Invited Speaker .  
 2006 Aug Lorentz Institute, Leiden, NL. Invited Speaker.  
 2006 Sept Florida State University, Tallahassee, Colloquium.  
 2006 Oct Canadian Institute for Advanced Research, annual meeting. Vancouver, Canada. Invited Sp  
 2006 Oct Harvard, Cambridge US. Seminar.  
 2006 Nov ACTP conference on correlated matter, Pohang, Korea. Invited Speaker.

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

2008 Jan Seminar, Royal Holloway, University London  
 2008 Jan Seminar, NYU  
 2008 Feb Seminar, Boston U.

2008 Mar Seminar, Unicamp, Campinas, Brazil  
2008 Mar Seminar, Yale University  
2008 April Colloquium, U Colorado, Bolder  
2008 April Colloquium, Los Alamos National Lab, NM  
2008 June Seminar, Max Planck Inst fur Complexer System, Dresden  
2008 June Colloquium, Max Planck Inst fur Complexer System, Dresden  
2008 July Boulder Summer School, Three Lectures  
2008 Aug Plenary Talk, SCES 2008, Buzios, Brazil  
2008 Sept Invited talk, PITP workshop on quantum criticality, Toronto  
2008 Oct Colloquium, SUNY, Stony Brook  
2008 Oct Seminar, Brookhaven National Labs

2009 Jan Invited Talk, Quantum Critical Phenomena in Superclean Materials, Hawaii  
2009 Jan Colloquium, MPICFS, Dresden  
2009 Jan Colloquium, Technical U. Vienna, Austria  
2009 April Colloquium, U. Toronto, Canada  
2008 April Colloquium, Perimeter Institute, Waterloo, Canada  
2009 April Keynote Speaker, Perimeter Institute CMP workshop.