Dr. Mark P. M. Dean

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Born: September 9, 1983

Employment

Physicist, Brookhaven National Laboratory, 2017-present.

Associate Physicist, Brookhaven National Laboratory, 2014-2017.

Assistant Physicist, Brookhaven National Laboratory, 2012-2014.

Research Associate, Brookhaven National Laboratory, 2010-2012.

Education

Ph.D. Physics, University of Cambridge, UK, 2010.

M.Sci. Physics, University of Nottingham, UK, 2006.

Professional activities and memberships

Ex-officio member of the Science Advisory Committee of NSLS-II, September 2018-May 2019

Member of the Editorial Board for Physical Review X, March 2018-present

Chair of the NSLS-II Users' Executive Committee, May 2018-May 2019

Vice Chair of the NSLS-II Users' Executive Committee, May 2017-May 2018

Member of the Beamline Advisory Team for the Soft Inelastic X-Ray Beamline at NSLS-II, July 2014 - July 2016

Member of the Users' Working Group for the I21 RIXS beamline at Diamond Light Source, November 2015-present

Chair of the Inelastic Scattering Proposal Review Panel at the Advanced Photon Source, March 2015 - March 2017

Member of the Scattering Proposal Review Panel at the Advanced Photon Source, Jan 2013 - March 2015

Local contact for beamline X22C at the National Synchrotron Light Source, November 2011 - September 2014

Funding proposal reviewer for Department of Energy X-Ray Scattering Program, Deutsche Forschungsgemeinschaft (German Research Foundation), Swiss National Science Foundation and Netherlands Organisation for Scientific Research

External beamtime proposal reviewer for the Canadian Light Source, Stanford Synchrotron Radiation Lightsource and the Advanced Light Source

Member of the Institute of Physics, UK and American Physical Society

Referee for Nature Physics, Nature Communications, Physical Review X, Physical Review Letters, Physical Review Materials, Physical Review B, New Journal of Physics, Journal of Synchrotron Radiation, Scientific Reports, Physica B, Journal of Physics Condensed Matter, Journal of Applied Physics, Superconducting Science Technology and Central European Journal of Physics

Member of the Conference Organizing Committee for Inelastic X-Ray Scattering 2019 and Resonant Elastic X-Ray Scattering 2019

Funding

Department of Energy Early Career Award. Sole PI of 5 year, $2.5M program

Center for Emergent Superconductivity, Energy Fronteer Research Center. Co-PI of $14M program

Center for Computational Materials Science, Co-PI of $12M program

Dynamics and Control of Magnetic and Charge Order in Complex Oxides, Co-PI of $3.6M program

Chinese Academy of Science – Department of Energy joint-collaboration travel program. One of two co-PIs of $150k program lead by Xuerong Liu.

Postdoctoral Fellows

Yao Shen (Auguts 2019-), Daniel Mazzone (June 2019-), Derek Meyers (August 2015 - October 2018), Hu Miao (June 2015 - present), Gilberto Fabbris (Nov 2014 - Oct 2017)

Graduate Students

Jiaqi Lin (October 2018 -October 2019) (hosted by me with degree awarded by the Chinese Academy of Science)

Invited talks

1. "Time, momentum and energy-resolved measurements of transient magnetism in quantum materials", 10^{th} Ringberg Workshop on Science with FELs
2. "Ultrafast energy and momentum resolved dynamics of magnetic correlations in photo-doped Mott insulator Sr_2IrO_4", Joint MMM-intermag Conference, Washington DC, January 2019
3. "Ultrafast energy- and momentum-resolved dynamics of magnetic correlations in photo-doped Mott insulating iridates", ASU Quantum Materials Workshop, Pheonix, USA January 2019
4. "Ultrafast dynamics of spin and orbital correlations in quantum materials: an energy- and momentum-resolved perspective", LCLS Users' Meeting, Stanford, USA, September 2018
5. "Magnetism in artificial Ruddlesden-Popper iridate heterostructures probed by RIXS", APS-U Upgrade Workshop, Argonne National Laboratory, USA, September 2018

6. "Precusor CDWs in Cuprates and Unfrustrated Magnetism in Iridates", RIXS/REXS 2018, Diamond Light Source, UK, June 2018
7. "Magnetism in artificial Ruddlesden-Popper iridates leveraged by structural distortions, interlayer coupling and ultra-fast optical excitation", Complex Quantum Matter, Rome, Italy, June, 2018
8. "Magnetism in artificial Ruddlesden-Popper iridates leveraged by structural distortions, interlayer coupling and ultra-fast optical excitation", American Physical Society March Meeting, Los Angeles, March, 2018
9. "RIXS studies of charge ordered, heterostructured and photo-excited Mott insulators", Resonant X-Ray Scattering (RIXS) Workshop, Flatiron Insitute, March 2018
10. "Ultrafast Energy and Momentum Resolved Dynamics of Magnetic Correlations in Photo-Doped Mott Insulator Sr_2IrO_4", Ultrafast Dynamics and Metastabilitity, Georgetown, USA, November 2017
11. "RIXS studies of quasi-correlated states and heterostructures of complex oxides", FLEX Workshop at the ALS Users' Meeting, Berkeley, USA, October 2017
12. "How Heterostructuring and Doping Modifies the Orbitals and Spin Interactions in Nickelates" National Syncrotron Radiation Research Center Users' Meeting, Hsinshu, Taiwan, September 2017
13. "How Heterostructuring and Doping Modifies the Orbitals and Spin Interactions in Nickelates" New Generation in Strongly Correlated Electron Systems 2017, Barcelona, USA, September 2017
14. "Precursor Charge Density Wave in $La_{2-x}Ba_xCuO_4$", Inelastic X-Ray Scattering 2017, Hamburg, Germany, August 2017
15. "Magnetism in artificial Ruddlesden-Popper iridates leveraged by structural distortions and interlayer coupling", Workshop on Quantum Materials: Electronic Correlations, Spin-Orbit Coupling, and Topology, Oak Ridge, USA, August 2017
16. "X-Ray View of Charge Correlations in the Cuprates", Gordon Conference on Frontier Science with Forefront Synchrotrons and XFEL Sources, Easton, USA, July 2017
17. "Nature of the charge density waves in cuprate superconductors", Energy Fronteers Research Centers PI meeting, Washington DC, USA, July 2017
18. "Precursor Charge Density Waves in $La_{2-x}Ba_xCuO_4$", Tenth Workshop on Competing Interactions and Colossal Responses in Transition Metal Oxides, Telluride, USA, June 2017
19. "Precursor Charge Density Wave in $La_{2-x}Ba_xCuO_4$ ", Superstripes 2017, Naples, Italy, June 2017
20. "Opportunities for Resonant Inelastic X-ray Scattering at FELs", Quantum Materials Workshop for LCLSII, Stanford, September 2016
21. "Orbital Polarization Driven by Anisotropic Hybridization in a Nickelate Heterostructure determined by Resonant Inelastic X-Ray Scattering", Superstripes 2016, Naples, Italy, June 2016
22. "Ultrafast energy and momentum resolved dynamics of magnetic correlations in photo-doped Mott insulator Sr_2IrO_4", American Physical Society March Meeting, March 2016
23. "Nature of the ultra-fast magnetic correlations in photo-doped Mott insulator Sr_2IrO_4", Inelastic X-Ray Scattering 2015, Hsinchu, Taiwan, November 2015
24. "Ultra-fast magnetic dynamics in Sr_2IrO_4", International Conference on Electronic Structure and Spectroscopy, Stony Brook, USA, Sept 2015

25. "Ultra-fast magnetic dynamics in Sr_2IrO_4", Superstripes 2015, Naples, Italy, June 2015
26. "Resonant inelastic x-ray scattering as a probe of strongly correlated materials", X-Ray Scattering Principal Investigators' Meeting, Gaithersburg, USA, November 2014
27. "Magnetic excitations in hole-doped cuprates and their evolution with doping and dimensionality", 20th National Synchrotron Radiation Research Center Users' Meeting, Hsinchu, Taiwan, September 2014
28. "Magnetic excitations in cuprates and iridates probed by resonant inelastic x-ray scattering", Energy Materials Nanotechnology Conference, Cancun, Mexico, June 2014
29. "Doping evolution of the magnetic excitations in the cuprates and its implications for superconductivity", NSLS/NSLS-II & CFN Joint Users' Meeting, Upton, NY, USA, May 2014
30. "Doping evolution of the magnetic excitations in the cuprates and its implications for superconductivity", International Conference on Superconductivity and Magnetism 2014, Antalya, Turkey, April 2014
31. "Doping evolution of the magnetic excitations in the cuprates and its implications for superconductivity", American Physical Society March Meeting, Denver, Colorado, March 2014
32. "High-energy magnetic excitations in $Bi_2Sr_2CaCu_2O_{8+\delta}$: Towards a unified description of the electronic and magnetic degrees of freedom in the cuprates", Paul Scherrer Institut Users' Meeting, Villigen, Switzerland, Sep 2013
33. "Magnetic excitations in the cuprates and their evolution with doping and dimensionality", IXS2013, Stanford, USA, Aug 2013
34. "Magnetic excitations in the cuprates and their evolution with doping and dimensionality", Gordon Research Seminar on X-ray Science, Easton, USA, Aug 2013
35. "Magnetic excitations in the cuprates and their evolution with doping and dimensionality", Gordon Research Seminar, Les Diablerets, Switzerland, May 2013
36. "Novel Magnetic Interactions in Model Iridate, Sr_3CuIrO_6, and Possible Spin Liquid, $Na_4Ir_3O_8$", Advanced Photon Source Users' Meeting, Argonne National Laboratory, USA, May 2013
37. "High-energy magnetic excitations in $Bi_2Sr_2CaCu_2O_{8+\delta}$: Towards a unified description of the electronic and magnetic degrees of freedom in the cuprates", Strongly Correlated Physics in the Cuprates, Montauk, USA, May 2012

Departmental seminars and contributed talks

38. "Observation of Double Weyl Phonons in Parity-Breaking FeSi", American Physical Society March Meeting, Boston, March 2019
39. "X-ray vision of spins, charges and orbitals for understanding emergent electronic states in complex oxides", University of Illinois, Urbana-Champaign, Febuary 2019
40. "X-ray vision of spins, charges and orbitals for understanding emergent electronic states in complex oxides", Boston University, Boston, November 2018
41. "X-ray vision of spins, charges and orbitals for understanding emergent electronic states in complex oxides", ShanghaiTech University, Shanghai, August 2018

42. "X-ray vision of spins, charges and orbitals for understanding emergent electronic states in complex oxides", Insitute of Physics, Chinese Academy of Science, Beijing, August 2018
43. "Interrogating spins, charges and orbitals in complex oxides with resonant x-rays", Flatiron Insitute, New York, March 2018
44. "X-ray vision of spins, charges and orbitals for understanding complex oxides", Columbia University, January 2018
45. "X-ray vision of spins, charges and orbitals for understanding complex oxides", Brown University, November 2017
46. "X-ray vision of charge, orbital and spin in complex oxide heterostructures and transient states", University of Cambridge, October 2017
47. "Resonant Inelastic X-Ray Scattering as a Probe of Quantum Materials", Many Electrons Summer school, Simons Foundation, Stony Brook University, June, 2017
48. "Spin and orbital excitations and emergent phenomena in strongly correlated oxides", Univeristy of Virginia, December, 2016
49. "Spin and orbital excitations and emergent phenomena in strongly correlated oxides", Rutgers, October, 2016
50. "Ultrafast energy and momentum resolved dynamics of magnetic correlations in photo-doped Mott insulator Sr_2IrO_4", Second Workshop on Ultrafast Dynamics in Strongly Correlated Systems, Villigen, Switzerland, October 2016
51. "Spin and orbital excitations and emergent phenomena in strongly correlated oxides", American Physical Society Offices, Upton, USA, August 2016
52. "Orbital engineering in nickelate heterostructures driven by anisotropic oxygen hybridization rather than orbital energy levels", Surface X-ray and Neutron Scattering 14, Stony Brook, USA, July 2016
53. "Inelastic x-ray scattering", X-ray Scattering in Condensed Matter Physics Tutorial, Baltimore, USA, March 2016
54. "Resonant inelastic x-ray scattering studies of superconductors and related quantum materials", 3rd Department of Energy, Basic Energy Sciences Chinese Academy of Sciences Workshop on Novel Superconductors and Related Quantum Materials, Stony Brook University, USA, September 2015
55. "Inelastic x-ray scattering ", Cheiron School, for synchrotron radiation science and technology, SPring8, Hyogo, Japan, September 2015
56. "Resonant inelastic x-ray scattering", Simons School for Condensed Matter Physics, Brookhaven National Laboratory, USA, June 2015
57. "Magnetic excitations in hole-doped cuprates and their evolution with doping and dimensionality", Diamond Light Source, UK, December 2015
58. "RIXS Studies Of Magnetic Excitations In Hole-Doped Cuprates", Université Paris VI, France, December 2014
59. "Magnetic excitations in hole-doped cuprates and their evolution with doping and dimensionality", Oak Ridge National Laboratory, USA, December 2014
60. "Magnetic excitations in hole-doped cuprates and their evolution with doping and dimensionality", Departmental Seminar University of California, Berkeley, September 2014

61. "Magnetic excitations in the cuprates and their evolution with doping and dimensionality", National Synchrotron Light Source, USA, April 2013
62. "Probing the high energy spin dynamics in the high-T_c cuprates", University of Connecticut, Sep 2012
63. "Electron-phonon interactions in doped graphite and graphene", Columbia University, New York, USA, Dec 2011
64. "Spin excitations in a single La_2CuO_4 Layer", IFW Dresden, Germany, Nov 2011
65. "Spin excitations in a single La_2CuO_4 Layer", Argonne National Laboratory, USA, Oct 2011
66. "Spin excitations in a single La_2CuO_4 Layer measured using resonant inelastic x-ray scattering", University of Cambridge, UK, Oct 2011
67. "Superconductivity in graphite intercalation compounds", University of Saint Andrews, UK, Oct 2009
68. "Electron-phonon interactions in superconducting graphite intercalation compounds", Brookhaven National Laboratory, USA, Sep 2009
69. "Raman scattering in graphite intercalation compounds", Université Pierre et Marie Curie, Paris, France, June 2009
70. "Raman scattering in graphite intercalation compounds", University College London, London, UK, May 2009
71. "Magnetism under pressure in $CeIn_2B_2$" Université Paris 6, Paris, France, Jan 2008

Publications

1. "Control of dopant crystallinity in electrochemically treated cuprate thin films", A. Frano, M. Bluschke, Z. Xu, B. Frandsen, Y. Lu, M. Yi, R. Marks, A. Mehta, V. Borzenets, D. Meyers, M. P. M. Dean, F. Baiutti, J. Maier, G. Kim, G. Christiani, G. Logvenov, E. Benckiser, B. Keimer, and R. J. Birgeneau, *Phys. Rev. Matt.* **3**, 063803 (2019)
2. "Charge Density Wave Memory in a Cuprate Superconductor", X. M. Chen, C. Mazzoli, Y. Cao, V. Thampy, A. M. Barbour, W. Hu, M. Lu, T. Assefa, H. Miao, G. Fabbris, G. D. Gu, J. M. Tranquada, M. P. M. Dean, S. B. Wilkins, I. K. Robinson, *Nature Comms.*, Article number: 1435 (2019)
3. "EDRIXS: An open source toolkit for simulating spectra of resonant inelastic x-ray scattering", Y. L. Wang, G. Fabbris, M. P. M. Dean, G. Kotliar, *Computer Physics Communications* **243**, 151-165 (2019) (2019)
4. "Magnetism in artificial Ruddlesden-Popper iridates leveraged by structural distortions", D. Meyers, Yue Cao, G. Fabbris, Neil J. Robinson, Lin Hao, C. Frederick, N. Traynor, J. Yang, Jiaqi Lin, M. H. Upton, D. Casa, Jong-Woo Kim, T. Gog, E. Karapetrova, Yongseong Choi, D. Haskel, P. J. Ryan, Lukas Horak, X. Liu, Jian Liu, and M. P. M. Dean, *Scientific Reports* **9**, Article number: 4263 (2019)
5. "Direct detection of dimer orbitals in $Ba_5AlIr_2O_{11}$", Y. Wang, Ruitang Wang, Jungho Kim, M. H. Upton, D. Casa, T. Gog, G. Cao, G. Kotliar, M. P. M. Dean, X. Liu, *Phys. Rev. Lett.* **122**, 106401 (2019)
6. "Novel spin-orbit coupling driven emergent states in iridate-based heterostructures", Lin Hao, D. Meyers, M. P. M. Dean, Jian Liu, *J. Phys. Chem. Solids* 128 39-53 (2019)

7. "Imaging antiferromagnetic antiphase domain boundaries using magnetic Bragg diffraction phase contrast", Min Gyu Kim, Hu Miao, Bin Gao, Sang-Wook Cheong, Claudio Mazzoli, Andi Barbour, Wen Hu, Stuart Wilkins, Ian Robinson, Mark Dean, and Valery Kiryukhin, *Nat. Comm.* 9, Article number:5013 (2018)

8. "Inverted orbital polarization in strained correlated oxide films", Paul C. Rogge, Robert J. Green, Padraic Shafer, Gilberto Fabbris, Andi M. Barbour, Benjamin M. Lefler, Elke Arenholz, Mark P. M. Dean, and Steven J. May, *Phys. Rev. B* **98**, 201115(R) (2018)

9. "Decoupling carrier concentration and electron-phonon coupling in oxide heterostructures observed with resonant inelastic x-ray scattering" D. Meyers, Ken Nakatsukasa, Sai Mu, Lin Hao, Junyi Yang, Yue Cao, G. Fabbris, Hu Miao, J. Pelliciari, D. McNally, M. Dantz, E. Paris, E. Karapetrova, Yongseong Choi, D. Haskel, P. Shafer, E. Arenholz, Thorsten Schmitt, Tom Berlijn, S. Johnston, Jian Liu, M. P. M. Dean, *Phys. Rev. Lett.* **121**, 236802 (2018)

10. "Ultrafast dynamics of spin and orbital correlations in quantum materials: an energy- and momentum-resolved perspective" Y. Cao, D. G. Mazzone, D. Meyers, J. P. Hill, X. Liu, S. Wall, M. P. M. Dean, *arXiv*:1809.06288 (2018); Accepted in Philosophical Transactions A

11. "Emergent *c*-axis magnetic helix in manganite-nickelate superlattices", G. Fabbris, N. Jaouen, D. Meyers, J. Feng, J. D. Hoffman, R. Sutarto, S. G. Chiuzbăian, A. Bhattacharya and M. P. M. Dean, *Phys. Rev. B* **98**, 180401(R) (2018)

12. "Observation of Double Weyl Phonons in Partity-Breaking FeSi", H. Miao, T. T. Zhang, L. Wang, D. Meyers, A. H. Said, Y. L. Wang, Y. G. Shi, H. M. Weng, Z. Fang, and M. P. M. Dean, *Phys. Rev. Lett.* **121**, 035302 (2018)

13. "Decoupled Pairing Amplitude and Electronic Coherence in Iron-Based Superconductors", H. Miao, W. H. Brito, Z. P. Yin, R. D. Zhong, G. D. Gu, P. D. Johnson, M. P. M. Dean, S. Choi, G. Kotliar, W. Ku, X. C. Wang, C. Q. Jin, S. -F. Wu, T. Qian, and H. Ding, *Phys. Rev. B* **98**, 020502 (2018)

14. "Giant magnetic response of a two-dimensional antiferromagnet", Lin Hao, D. Meyers, Hidemaro Suwa, Junyi Yang, Clayton Frederick, Tamene R. Dasa, Gilberto Fabbris, Lukas Horak, Dominik Kriegner, Yongseong Choi, Jong-Woo Kim, Daniel Haskel, Philip J. Ryan, Haixuan Xu, Cristian D. Batista, M. P. M. Dean, Jian Liu, *Nat. Phys.* **14**, 806-810 (2018)

15. "Incommensurate phonon anomaly and the nature of charge density waves in cuprates", H. Miao, D. Ishikawa, R. Heid, M. Le Tacon, G. Fabbris, D. Meyers, G. D. Gu, A. Q. R. Baron, and M. P. M. Dean, *Phys. Rev. X* **8**, 011008 (2018)

16. "On the possibility to detect multipolar order in URu_2Si_2 by the electric quadrupolar transition of resonant elastic X-ray scattering", Y. L. Wang, G. Fabbris, D. Meyers, N. H. Sung, R. E. Baumbach, E. D. Bauer, P. J. Ryan, J.-W. Kim, X. R. Liu, M. P. M. Dean, G. Kotliar and X. Dai, *Phys. Rev. B* **96**, 085146 (2017)

17. "Static Charge Density Wave Order in the Superconducting State of $La_{2-x}Ba_xCuO_4$" V. Thampy, X. M. Chen, Y. Cao, C. Mazzoli, A. M. Barbour, W. Hu, H. Miao, G. Fabbris, R. D. Zhong, G. D. Gu, J. M. Tranquada, I. K. Robinson, S. B. Wilkins, M. P. M. Dean, *Phys. Rev. B* **95**, 241111(R) (2017)

18. "Two-dimensional $J_{\text{eff}} = 1/2$ antiferromagnetic insulator unraveled from interlayer exchange coupling in artificial perovskite iridate superlattices", L. Hao, D. Meyers, C. Frederick, G. Fabbris, J. Y. Yang, N. Traynor, L. Horak, D. Kriegner, Y. S. Choi, J. W. Kim, D. Haskel, P. J. Ryan, M. P. M. Dean, J. Liu, *Phys. Rev. Lett.* **119**, 027204 (2017)

19. "High-temperature charge density wave correlations in $La_{1.875}Ba_{0.125}CuO_4$ without spin-charge locking", H. Miao, J. Lorenzana, G. Seibold, Y.Y. Peng, A. Amorese, F. Yakhou-Harris, K. Kummer, N. B. Brookes, R. M. Konik, V. Thampy, G. D. Gu, G. Ghiringhelli, L. Braicovich, M. P. M. Dean, *Proc. Natl. Acad. Sci. U.S.A.* **114**(47) 12430-12435 (2017)

20. "Doping Dependence of Collective Spin and Orbital Excitations in Spin 1 Quantum Antiferromagnet $La_{2-x}Sr_xNiO_4$ Observed by X-rays" G. Fabbris, D. Meyers, L. Xu, V. M. Katukuri, L. Hozoi, X. Liu, Z.-Y. Chen, J. Okamoto, T. Schmitt, A. Uldry, B. Delley, G. D. Gu, D. Prabhakaran, A. T. Boothroyd, J. van den Brink, D. J. Huang, M. P. M. Dean, *Phys. Rev. Lett.* **118**, 156402 (2017)

21. "Doping dependence of the magnetic excitations in $La_{2x}Sr_xCuO_4$", D. Meyers, H. Miao, A. C. Walters, V. Bisogni, R. S. Springell, M. d'Astuto, M. Dantz, J. Pelliciari, H. Huang, J. Okamoto, D. J. Huang, J. P. Hill, X. He, I. Božović, T. Schmitt, M. P. M. Dean, *Phys. Rev. B* **95**, 075139 (2017)

22. "Resonant inelastic X-ray scattering study of spin-wave excitations in the cuprate parent compound $Ca_2CuO_2Cl_2$", B. W. Lebert, M. P. M. Dean, A. Nicolaou, J. Pelliciari, M. Dantz, T. Schmitt, R. Yu, M. Azuma, J-P. Castellan, H. Miao, A. Gauzzi, B. Baptiste, M. d'Astuto, *Phys. Rev. B* **95**, 155110 (2017)

23. Yue Cao, Xuerong Liu, Wenhu Xu, Weiguo Yin, Derek Meyers, Jungho Kim, Diego Casa, Mary Upton, Thomas Gog, Tom Berlijin, Gonzalo Alvarez, Shujuan Yuan, Jasminka Terzic, J. M. Tranquada, John P. Hill, Gang Cao, Robert M. Konik, M. P. M. Dean, "Giant Spin Gap and Magnon Localization in the Disordered Heisenberg Antiferromagnet $Sr_2Ir_{1-x}Ru_xO_4$", *Phys. Rev. B Rapid Communications* **95**, 121103(R) (2017)

24. Jason D. Hoffman, Brian J. Kirby, Jihwan Kwon, Gilberto Fabbris, Derek Meyers, John W. Freeland, Ivar Martin, Olle G. Heinonen, Paul Steadman, Hua Zhou, Christian M. Schlepütz, Mark P. M. Dean, Suzanne G. E. te Velthuis, Jian-Min Zuo, and Anand Bhattacharya, "Oscillatory noncollinear magnetism induced by interfacial charge transfer in superlattices composed of metallic oxides", *Phys. Rev. X* **6**, 041038 (2016)

25. G. Fabbris, D. Meyers, J. Okamoto, J. Pelliciari, A. S. Disa, Y. Huang, Z.-Y. Chen, W. B. Wu, C. T. Chen, S. Ismail-Beigi, C. H. Ahn, F. J. Walker, D. J. Huang, T. Schmitt, M. P. M. Dean "Orbital Engineering in Nickelate Heterostructures Driven by Anisotropic Oxygen Hybridization rather than Orbital Energy Levels", *Phys. Rev. Lett.* **117**, 147401 (2016)

26. X. M. Chen, V. Thampy, C. Mazzoli, A. M. Barbour, H. Miao, G.D. Gu, Y. Cao, J. M. Tranquada, M. P. M. Dean and S. B. Wilkins, "Remarkable Stability of Charge Density Wave Order in $La_{1.875}Ba_{0.125}CuO_4$", *Phys. Rev. Lett.* **117**, 167001 (2016)

27. M. P. M. Dean, Y. Cao, X. Liu, S. Wall, D. Zhu, R. Mankowsky, V. Thampy, X. M. Chen, J. Vale, D. Casa, Jungho Kim, A. H. Said, P. Juhas, R. Alonso-Mori, M. Glownia, A. Robert, J. Robinson, M. Sikorski, S. Song, M. Kozina, H. Lemke, L. Patthey, S. Owada, T. Katayama, M. Yabashi, Yoshikazu Tanaka, T. Togashi, J. Liu, C. Rayan Serrao, B. J. Kim, L. Huber, C.-L. Chang, D. F. McMorrow, M. Först, and J. P. Hill, "Ultrafast energy and momentum resolved dynamics of magnetic correlations in photo-doped Mott insulator Sr_2IrO_4", *Nature Materials*, **15** 601-605 (2016)

28. Xuerong Liu, M. P. M. Dean, Z. Y. Meng, M. H. Upton, T. Qi, T. Gog, H. Ding, G. Cao, H. P. Hill, "Anisotropic softening of magnetic excitations in lightly electron doped Sr_2IrO_4", *Phys. Rev. B Rapid Communications* **93**, 241102(R) (2016)

29. Tom Hogan, Z. Yamani, D. Walkup, Xiang Chen, Rebecca Dally, Thomas Z. Ward, M. P. M. Dean, John Hill, Z. Islam, Vidya Madhavan, and Stephen D. Wilson. "First-order melting of a weak spin-orbit mott insulator into a correlated metal", *Phys. Rev. Lett.*, **114** 257203 (2015).

30. Robert P. Smith, Thomas E. Weller, Christopher A. Howard, Mark P.M. Dean, Kaveh C. Rahnejat, Siddharth S. Saxena, and Mark Ellerby, " Superconductivity in graphite intercalation compounds", *Physica C: Superconductivity and its Applications*, **514**(0) 50 – 58, (2015).

31. X. Liu, M.P.M. Dean, J. Liu, S. G. Chiuzbăian, N. Jaouen, A. Nicolaou, W. G. Yin, C. Rayan Serrao, R. Ramesh, H. Ding, and J. P. Hill, "Probing single magnon excitations in Sr_2IrO_4 using O *K*-edge resonant inelastic X-ray scattering", *J. Phys.: Condens. Matter* **27**, 202202 (2015).

32. M.P.M. Dean, "Insights into the high temperature superconducting cuprates from resonant inelastic x-ray scattering", *Journal of Magnetism and Magnetic Materials* **376**, 3 – 13 (2015).

33. V. Thampy, M. P. M. Dean, N. B. Christensen, L. Steinke, Z. Islam, M. Oda, M. Ido, N. Momono, S. B. Wilkins, and J. P. Hill, "Rotated stripe order and its competition with superconductivity in $La_{1.88}Sr_{0.12}CuO_4$", *Phys. Rev. B Rapid Communications* **90**, 100510 (2014).

34. S. E. Rowley, L. J. Spalek, R. P. Smith, M.P.M. Dean, M. Itoh, J. F. Scott, G. G. Lonzarich, and S. S. Saxena. "Ferroelectric quantum criticality" *Nature Physics* **10**, 367–372 (2014).

35. Wei-Guo Yin, X. Liu, A. M. Tsvelik, M. P. M. Dean, M. H. Upton, Jungho Kim, D. Casa, A. Said, T. Gog, T. F. Qi, G. Cao, and J. P. Hill, "Ferromagnetic exchange anisotropy from antiferromagnetic superexchange in the mixed $3d-5d$ transition-metal compound Sr_3CuIrO_6", *Phys. Rev. Lett.* **111**, 057202 (2013).

36. M. P. M. Dean, G. Dellea, M. Minola, S. B. Wilkins, R. M. Konik, G. D. Gu, M. Le Tacon, N. B. Brookes, F. Yakhou-Harris, K. Kummer, J. P. Hill, L. Braicovich, and G. Ghiringhelli, "Magnetic excitations in stripe-ordered $La_{1.875}Ba_{0.125}CuO_4$ studied using resonant inelastic x-ray scattering", *Phys. Rev. B Rapid Communications*, **88** 020403 (2013).

37. V. Thampy, S. Blanco-Canosa, M. Garcia-Fernandez, M. P. M. Dean, G. D. Gu, M. Först, T. Loew, B. Keimer, M. Le Tacon, S. B. Wilkins, and J. P. Hill, " Comparison of charge modulations in $La_{1.875}Ba_{0.125}CuO_4$ and $YBa_2Cu_3O_{6.6}$", *Phys. Rev. B*, **88** 024505 (2013).

38. M. P. M. Dean, G. Dellea, R. S. Springell, F. Yakhou-Harris, K. Kummer, N. B. Brookes, X. Liu, Y-J. Sun, J. Strle, T. Schmitt, L. Braicovich, G. Ghiringhelli, I. Bozovic, and J. P. Hill, " Persistence of magnetic excitations in $La_{2-x}Sr_xCuO_4$ from the undoped insulator to the heavily overdoped non-superconducting metal", *Nature Materials* **12**, 1018–1022, (2013)

39. M. P. M. Dean, A. J. A. James, R. S. Springell, X. Liu, C. Monney, K. J. Zhou, R. M. Konik, J. S. Wen, Z. J. Xu, G. D. Gu, V. N. Strocov, T. Schmitt, and J. P. Hill, "High-energy magnetic excitations in the cuprate superconductor $Bi_2Sr_2CaCu_2O_{8+\delta}$: Towards a unified description of its electronic and magnetic degrees of freedom", *Phys. Rev. Lett.* **110**, 147001 (2013).

40. M. G. Kim, J. Soh, J. Lang, M. P. M. Dean, A. Thaler, S. L. Bud'ko, P. C. Canfield, E. Bourret-Courchesne, A. Kreyssig, A. I. Goldman, and R. J. Birgeneau, "Spin polarization of Ru in superconducting $Ba(Fe_{0.795}Ru_{0.205})_2As_2$ studied by x-ray resonant magnetic scattering", *Phys. Rev. B* **88**, 014424 (2013).

41. X. Liu, Vamshi M. Katukuri, L. Hozoi, Wei-Guo Yin, M. P. M. Dean, M. H. Upton, Jungho Kim, D. Casa, A. Said, T. Gog, T. F. Qi, G. Cao, A. M. Tsvelik, Jeroen van den Brink, and J. P. Hill, "Testing the validity of the strong spin-orbit-coupling limit for octahedrally coordinated iridate compounds in a model system Sr_3CuIrO_6", *Phys. Rev. Lett.* **109**, 157401 (2012).

42. M. P. M. Dean, M. G. Kim, A. Kreyssig, J. W. Kim, X. Liu, P. J. Ryan, A. Thaler, S. L. Bud'ko, W. Strassheim, P. C. Canfield, J. P. Hill, and A. I. Goldman, " Magnetically polarized ir dopant atoms in superconducting $Ba(Fe_{1-x}Ir_x)_2As_2$". *Phys. Rev. B Rapid Communications* **85**, 140514 (2012).

43. M. P. M. Dean, R. S. Springell, C. Monney, K. J. Zhou, J. Pereiro, I. Božović, B. Dalla Piazza, H. M. Rønnow, E. Morenzoni, J. van den Brink, T. Schmitt, and J. P. Hill, "Spin excitations in a single La_2CuO_4 layer", *Nat. Mater.*, **11**, 850–854 (2012).

44. S. E. Rowley, R. P. Smith, M. P. M. Dean, L. .J. Spalek, M. L. Sutherland, M. Saxena, P. Alireza, C. Ko, C. Liu, E. Pugh, S. .E. Sebastian, and G. .G. Lonzarich, "Ferromagnetic and ferroelectric quantum phase transitions" *Physica Status Solidi (b)*, **247**(3), 469–475 (2010)

45. C. A. Howard, M. P. M. Dean, and F. Withers, " Phonons in potassium-doped graphene: The effects of electron-phonon interactions, dimensionality, and adatom ordering", *Phys. Rev. B Rapid Communications* **84**, 241404 (2011).

46. S. E. Rowley, R. P. Smith, N. Marcano, M. P. M. Dean, A. Kusmartseva, L. J. Spalek, E. C. T. O'Farrell, D. A. Tompsett, M. L. Sutherland, P. L. Alireza, C. Ko, C. Liu, E. Pugh, S. S. Saxena, and G. G. Lonzarich, "Novel metallic states at low temperatures", *Low Temperature Physics* **37**(1), 2 (2011)

47. S. B. Wilkins, M. P. M. Dean, Jörg Fink, Markus Hücker, J. Geck, V. Soltwisch, E. Schierle, E. Weschke, G. Gu, S. Uchida, N. Ichikawa, J. M. Tranquada, and J. P. Hill, "Comparison of stripe modulations in $La_{1.875}Ba_{0.125}CuO_4$ and $La_{1.48}Nd_{0.4}Sr_{0.12}CuO_4$", *Phys. Rev. B* **84**, 195101 (2011)

48. A. C. Walters, C. A. Howard, M. H. Upton, M. P. M. Dean, A. Alatas, B. M. Leu, M. Ellerby, D. F. McMorrow, J. P. Hill, M. Calandra, and F. Mauri, "Comparative study of the phonons in nonsuperconducting BaC_6 and superconducting CaC_6 using inelastic x-ray scattering", *Phys. Rev. B* **84**, 014511 (2011).

49. M. P. M. Dean, A. C. Walters, C. A. Howard, T. E. Weller, M. Calandra, F. Mauri, M. Ellerby, S. S. Saxena, A. Ivanov, and D. F. McMorrow, "Neutron scattering study of the high-energy graphitic phonons in superconducting CaC_6", *Phys. Rev. B* **82**, 014533 (2010)

50. M. P. M. Dean, C. A. Howard, S. S. Saxena, and M. Ellerby, "Nonadiabatic phonons within the doped graphene layers of XC_6 compounds", *Phys. Rev. B* **81**, 045405 (2010)

51. M. Plazanet, M. Dean, M. Merlini, A. Hüller, H. Emerich, C. Meneghini, M. R. Johnson, and H. P. Trommsdorff, "Crystallization on heating and complex phase behavior of α-cyclodextrin solutions" *The Journal of Chemical Physics* **125**(15), 154504 (2006)