Tanmoy Das

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Positions

2015 - Assistant professor in the Physics Department, Indian Institute of Science, Bangalore.
2014 – Senior Research Scientist at the Graphene Research Center, National University of Singapore.
2010 – 2014 Postdoctoral fellow at the Los Alamos National Laboratory, New Mexico, USA.
2010 – Adjunct Research Assistant Professor at Northeastern University, Boston, MA, USA.
2009 – 2010 Post Doctoral Position at Northeastern University, Boston, MA USA.

Education

2004 – 2009 Ph. D. (August 2009), Northeastern University, Boston, MA, USA
Supervisor: Prof. Arun Bansil.
2002 – 2004 M. Sc., Indian Institute of Technology-Bombay, Mumbai, India.
1999 – 2002 B. Sc., RKMRC, Calcutta University, WB, India.

Awards/Nominations

2013 Received Achievement Award for High Impact Science in the Early Career category from LBNL, Berkeley, USA.
2012 Received Postdoc Distinguished Performance Award at Los Alamos National Laboratory, USA.
2012 Received best poster award at Material Research Science (MRS) Spring Conference, San Francisco, CA, USA.
2004 Received best M. S. research project award in Indian Institute of Technology (IIT)-Bombay, India
2004 Elected in National Eligibility Test in India (highest ranked national level skill for fostering faculty and higher level positions in India).
2003, ’04 Received prestigious Summer Fellowship at S. N. Bose Natl. Center for Basic Science, India.

Research Experience

2010 - 2014 Integrated modeling of correlated materials, metal-insulaltor transition, superconductivity in cuprates, pnictides, heavy fermions, actinides, as well as topological insulators, graphene, two-dimensional electron gas, and biological systems (DNA).

2004 - 2009 "A model of coexistence of antiferromagnetism and superconductivity in electron- and hole-doped cuprates." This was my PhD topic in which I mainly focused on developing an intermediate coupling model of cuprates.

2003 & 2004 "Study of electronic structure and elastic properties of transition metal and actinide carbides." This was a summer fellowship program under the supervision of Prof. Abhijit Mookerjee at S.N. Bose National Center for Basic Science, Kolkata, India. [Details in Physica B (2005).]

2003 – 2004 "Local properties and one and two electron molecular wavefunctions." This was a MS project under the supervision of Prof. S. H. Patil (IIT Bombay, India). I received the best project award at IIT Bombay.

Research Interests and Highlights

- The overreaching goal of my research is to understand, predict and engineer fundamental to functional physical properties that define a large class of materials as different as quantum many body effect, superconductivity and Dirac materials and various emergent properties arising from their combinations. I plan to engineer and design advanced materials with complex properties and enhanced tunability by stacking one atom at a time or in layer by layer approaches.

- I have recently introduced a concept of '*spin-orbit density wave*' as a new paradigm of emergent phase of matter in spin-orbit coupled systems.

- I have recently proposed two design principles for *engineering and tailoring topological insulators and Dirac materials* and their properties in heterostructures and superlattices, instead of relying on the natural materials.

- I have introduced the concept and theory of *intermediate coupling model* which captures the full momentum and energy dependence of the electronic correlation spectrum, and is applicable to systems even where existing methods such as Fermi liquid and DMFT fail.

Collaborations

With the following professors and staff members, I have at least 1 paper (published or submitted): Prof. Hsin Lin (Graphene Research Center, Singapore), Prof. John Rehr (University of Washington, Seattle, USA), Prof. M. Z. Hasan (Princeton University, USA), Prof. Vidya Madhavan (Boston College, USA), Prof. Hai-Hu Wen (Nanjing University, China), Prof. Eric Hudson (Penn State University, USA), Prof. Joel Mesot (PSI, Switzerland), Prof. Pengcheng Dai (University of Tennessee), Prof. Warren Pickett (University of California-Davis, USA), Prof. Matti Lindroos (Tampere University of Technology, Finland), Prof. Jouko Nieminen (Tampere University of Technology, Finland), Prof. Anton Vorontsov (Montana State University, USA), Prof. Ilya Vekhter (Louisiana State University, USA), Prof. Svetlana Kilina (North Dakota State University, USA), Prof. Abhijit Mookerjee (S.N. Bose Natl. Center for Basic Science India), Dr. Filip Ronning, Dr. Tomasz Durakiewicz, Dr. John Joyce, Dr. J. Sarrao (Los Alamos Natl. Lab.). I also continue my close collaborations with Prof. Arun Bansil, Prof. Robert S. Markiewicz from Northeastern University, USA, and Dr. Alexander V. Balatsky, Dr. Mattias J. Graf, and Dr. Jian-Xin Zhu from Los Alamos Natl. Lab, USA.

Editorial Board Member and Referee of Journals

Editorial board member: Scientific Reports from Nature Publishing Group.
International Journal of Superconductivity from Hindawi Publishing Corporation.

Referee: Nature Communications, Physical Review Letters, Physical Review B, New Journal of Physics, Physica B, Physica C, Journal of Physics and Chemistry of Solids, Europhysics Letters.

Numerical Techniques and Computational Skills

1. have solely developed a quantum mechanical atomistic quasiparticle-GW or QP-GW code which computes the state-of the art electron-electron interaction spectra using full momentum and energy dependent self-energy, and many spectroscopic and transport properties of correlated systems with first-principles band structure input.

2. I use the professional first principle code TB-LMTO (Tight Binding Linear Muffin-Tin Orbital code from the O. K. Andersen group). I also use the first principle codes including Wien-2K (commercial), KKR (Internal code of Bansil's group), Quantum Espresso (commercial), VASP (commercial).

3. We have succeeded in incorporating correlations into x-ray absorption spectra (XAS) and resonant inelastic x-ray scattering (RIXS) spectra within first-principles FEFF code from Prof. J. Rehr's group.

4. I have more than 12 years of extensive experience in programming in Fortran 77/90/95 and MPI parallelization techniques, Matlab, Mathematica and C/C++ and Paraview (3D visualization).

Teaching Experience

- Teaching Assistant, Northeastern University (two semesters in 2004-2005)
  - Instructed introductory physics labs for engineering and life science students.
  - Conducted interactive learning sessions and workshops to help solve home works and other problems for undergraduate students.
  - Graded undergraduate introductory physics courses.

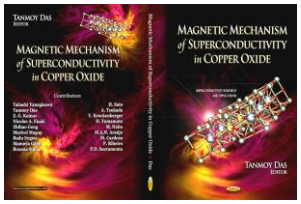
- My teaching philosophy includes engaging and motivating student in learning fundamental physics to numerical simulation with a broad perspective to the underlying quest of science.

Professional Activities

2008 Member of Science Magazine, maintained and sponsored by American Association for the Advancement of Science (AAAS) based on nomination.
2009 Member of Computational Materials Science Network (CMSN), sponsored by the U.S. Department of Energy (DOE), Office of Basic Energy Sciences.
2004 Member of the American Physical Society (APS) and Nature Publishing Group, and Material Research Society

Book

Magnetic mechanism of superconductivity in copper-oxide.
Editor and author of a chapter: **Tanmoy Das.**
Publishers: Nova Publishing Group, NY (2012).



News Article and Cover Page

Testing the sign-changing superconducting gap in iron-based superconductors with quasiparticle interference and neutron scattering,
Tanmoy Das, and A. V. Balatsky,
J. Phys.: Condens. Matter (Fast Track Comm.) **24**, 182201 (2012).
- Selected for the cover-page of this journal in Issue 18.
News article in Institute of Physics:
http://iopscience.iop.org/0953-8984/labtalk-article/49396

Published papers

Summary of publications		
Advances in Physics	1 article,	1 first authored
Review article (JMR)	1 article,	1 first authored
Nature Communications	1 article,	1 first authored
Nano Letters:	4 article,	0 first authored
Scientific Reports	1 article,	1 first authored, 1 single authored
Physical Review X	1 article,	1 first authored
Physical Review Letters	5 articles,	5 first authored, 1 single authored
Physical Review B	29 articles,	17 first authored, 6 single authored
New Journal of Physics	3 articles,	1 first authored
Europhysics Letters	1 article,	1 first authored
Philosophical Magazine	1 article,	1 first authored, 1 single authored
J. Phys.: Condens. Mat.	2 articles,	1 first authored
J. Phys. Chem. Solid	2 articles,	1 first authored
J. Supercond. Nov. Mag.	2 articles,	1 first authored, 1 single authored
J. Elec. Spec. Rel. Phenom.	1 article,	0 first authored
Physica B	1 article,	1 first authored
Submitted to journals (3 invited reviews)	8 articles,	4 first authored, 1 single authored

Total published articles is 56. Total number of citations, and H-index are 777 and 16, respectively, from Google scholars.

1. **Tanmoy Das**, K. Dolui, *Superconducting dome in MoS_2 and $TiSe_2$ generated by quasiparticle-phonon coupling,*
   Physical Review B **91**, 094510 (2015). Preprint at arXiv:1411.3096.

2. **Tanmoy Das**, J.-X. Zhu, M. J. Graf, *Theory of nodal s^{+-} wave pairing symmetry in the Pu-*

based 115 superconductor family
Scientific Reports B, 8632 (2015). Preprint at arXiv:1311.6410.

3. Y. Lu, W. Xu, M. Zeng, G. Yao, L. Shen, M. Yang, Z. Luo, F. Pan, Ke Wu,**Tanmoy Das**, P. He, J. Jiang, J. Martin, Y. P. Feng, H. Lin, X.-S. Wang , *Topological properties determined by atomic buckling in self-assembled ultrathin Bi (110)*
Nano Letters **15**, 80-87 (2015).

4. F.-C. Chuang, L.-Zi Yao, Z.-Q. Huang, Yu-T. Liu, C.-H. Hsu,Tanmoy Das H. Lin, A. Bansil, *Prediction of large-gap two-dimensional topological insulators consisting of bilayers of group III elements with Bi*
Nano Letters **14**, 2505-2508 (2014).

5. **Tanmoy Das,** *Spin-orbit density wave: A nonmagnetic phase of matter applicable to the hidden order state of URu_2Si_2,*
Philosophical Magazine (Published online 2014) [Invited], Preprint arXiv:1406.5271.

6. **Tanmoy Das**, *Imprints of spin-orbit density wave in the hidden order state in URu_2Si_2.*
Physical Review B **89**, 045135 (2014). Arxiv:1308.1992.

7. **Tanmoy Das**, *Weyl semimetal and superconductor designed in an orbital selective superlattice.*
Physical Review B **88**, 035444 (2013). Preprint at arXiv:1307.3697.

8. **Tanmoy Das**, A. V. Balatsky, *Origin of pressure induced second superconducting dome in $A_yFe_{2-x}Se_2$* [A=K, (Tl,Rb)].
New Journal of Physics **15**, 093045 (2012). Preprint at arXiv:1208.2468.

9. C. Zhang, H. Li, Y. Su, G. Tan, Y. Song, T. Netherton, C. Redding, S. Carr, O. Sobolev, A. Schneidewind, E. Faulhaber, S. Li, D.-X. Yao, **Tanmoy Das**, A. V. Balatsky, T. Brücke, P. Dai, *Distinguishing s^{+-} and s^{++} electron pairing symmetries by neutron spin resonance in superconducting $NaFe_{0.935}Co_{0.045}As$.*
Physical Review B **88**, 064504 (2013). Preprint at arXiv:1308.2453.

10. **Tanmoy Das**, A. V. Balatsky, *Engineering three dimensional topological insulator in Rashba-type spin-orbit coupled heterosrtucture.*
Nature Communications **4**, 1972 (2013). Preprint at arXiv:1302.4514.

11. H. Lin, **Tanmoy Das**, Y. Okada, M. Boyer, W. Wise, M. Tomasik, B. Zhen, E. Hudson, W.-W. Zhou, V. Madhavan, C.-Y. Ren, H. Ikuta, A. Bansil. *Topological dangling bonds with large spin splitting on the surfaces of Bi_2Se_3.*
Nano Letters **13**, 1915-1919 (2013).

12. Z. Huang, **Tanmoy Das**, A. V. Balatsky, D. Arovas, *Stability of Weyl metals under impurity scattering.*
Physical Review B **87**, 155123 (2013). Preprint at arXiv:1210.6121.

13. **Tanmoy Das**, *Discerning electronic fingerprints of nodal and antinodal nestings and their phase coherences in doped cuprate superconductors.*
Physical Review B **87**, 144505 (2013). Preprint at arXiv:1302.0308.

14. **Tanmoy Das**, A.B. Vorontsov, I. Vekhter, M. J. Graf, *Field-angle resolved anisotropy in superconducting CeCoIn5 using realistic Fermi surfaces,*
Physical Review B **87**, 175414 (2013). Preprint at arXiv:1303.6258.

15. **Tanmoy Das**, J.-X. Zhu, M. J. Graf. *Self-consistent spin-fluctuation spectrum and correlated electronic structure of actinides.*
Invited review in Journal of Material Research **28**, 659 (2013). Preprint at arXiv:1211.0240.

16. H. Lin, **Tanmoy Das**, Y.J. Wang, L.A. Wray, S.-Y. Xu, M. Z. Hasan, A. Bansil. *Adiabatic transformation as a search tool for new topological insulators: Distorted ternary Li_2AgSb-class semiconductors and related compounds.*
Physical Review B **87**, 121202 (Rapid comm.) (2013). Preprint at arXiv:1303.2228.

17. **Tanmoy Das.** *Spin-orbit density wave order: A new paradigm of broken symmetry phase of matter*.
Journal of Superconductivity and Novel Magnetism **26**, 1673-1677 (2013).

18. **Tanmoy Das**. *Interaction induced staggered spin-orbit order in two-dimensional electron gas*.
Physical Review Letters **109**, 187006 (2012). Preprint at arXiv:1211.2018.

19. **Tanmoy Das**, T. Durakiewicz, J. X. Zhu, J. J. Joyce, J. Sarrao, M. J. Graf. *Imaging the formation of high-energy dispersion anomalies in the actinide $UCoGa_5$*.
Physical Review X **2**, 041012 (2012). Preprint at arXiv:1206.1302.

20. **Tanmoy Das**. *Spin-orbit density wave induced hidden topological order in URu_2Si_2.*
Scientific Reports **2**, 596 (2012). Preprint at arXiv:1201.2246.

21. **Tanmoy Das**, A. Vorontsov, I. Vekhter, M. J. Graf. *Role of the Fermi-surface anisotropy in angle-dependent magnetic-field oscillations for identifying the energy-gap anisotropy of $A_yFe_2Se_2$ superconductors.*
Physical Review Letters **109**, 187006 (2012), Preprint at arXiv:1203.2211.

22. **Tanmoy Das**, J.-X. Zhu, M. J. Graf. *Spin fluctuations and peak-dip-hump in the photoemission spectrum of actinides*.
Physical Review Letters **108**, 017001 (2012). Preprint at arXiv:1108.0272.

23. T. Ahmed, S. Kilina, **Tanmoy Das**, J. Rehr, A. V. Balatsky. *Electronic fingerprints of DNA bases on graphene.*
Nano Letters **12**, 927 (2012).

24. H. Yang, Z. Wang, D. Fang, T. Kariyado, G. Chen, M. Ogata, **Tanmoy Das**, A. V. Balatsky, H.-H. Wen. *Unexpected weak spatial variation of local density of sates induced by individual Co impurity atoms in $Na(Fe_{0.95}Co_{0.05})As$ as revealed by scanning tunneling spectroscopy.*
Physical Review B **85**, 214512 (2012). Preprint at arXiv:1203.3123.

25. **Tanmoy Das.** *Electron-like Fermi-surface and in-plane anisotropy due to chain state in YBCO superconductors.*
Physical Review B **86**, 064527 (2012). Preprint at arXiv:1208.1979

26. **Tanmoy Das.** *Q=0 collective modes originating from the low-lying Hg-O band in the superconducting $HgBa_2CuO_{4+x}$*
Physical Review B **86**, 054518 (2012). Preprint at arXiv:1206.4292.

27. **Tanmoy Das.** *In-plane anisotropy in spin-excitation spectra originating from chain states in $YBa_2Cu_3O_{6+y}$.*
Physical Review B **85**, 144510 (2012).

28. **Tanmoy Das**, R. S. Markiewicz, A. Bansil. *Crossover from inelastic magnetic scattering of Cooper pairs to spin-wave dispersion produces low-energy kink in cuprates.*
Physical Review B **85**, 144526 (2012). Preprint at arXiv:1202.2596.

29. **Tanmoy Das**, R. S. Markiewicz, A. Bansil, A. V. Balatsky. *Visualizing electron pockets in cuprate.*
Physical Review B **85**, 224535 (2012). Preprint at arXiv:1203.5746.

30. R.S. Markiewicz, **Tanmoy Das**, A. Bansil. *Self energy and fluctuation spectra in cuprates: Comparing optical and photoemission results.*
Physical Review B **86**, 024511 (2012).

31. J. Nieminen, I. Suominen, **Tanmoy Das**, R.S. Markiewicz, A. Bansil. *Evidence of strong correlations at the van Hove singularity in the scanning tunneling spectra of superconducting $Bi_2Sr_2CaCu_2O_8$ single crystals.*
Physical Review B **85**, 214504 (2012). Preprint at arXiv:1205.5540.

32. Y. J. Wang, B. Barbiellini, H. Lin, **Tanmoy Das**, S. Basak, P. E. Mijnarends, S. Kaprzyk, R. S. Markiewicz, A. Bansil, *Lindhard and RPA susceptibility computations in extended momentum space in electron-doped cuprates*,
Physical Review B **85**, 224529 (2012).

33. A. Bansil, B. Barbiellini, S. Basak, **Tanmoy Das**, H. Lin. M. Lindroos, J. Nieminen, I. Suominen, Y.-J. Wang, R. S. Markiewicz, *Modeling highly resolved spectroscopies in complex materials*,
Journal of Superconductivity and Novel Magnetism **25,** 2135 (2012).

34. F. Ronning, J.-X. Zhu, **Tanmoy Das**, M. J. Graf, R. C. Albers, H. Rhee, W. E. Pickett. *Superconducting gap structure of the 115's revisited*,
Journal of Physics: Condensed Matter **24**, 294206 (2012). Preprint at arXiv:1203.0579.

35. **Tanmoy Das**, A. V. Balatsky. *Testing the sign-changing superconducting gap in the iron-based superconductors with quasiparticle interference and neutron scattering.*
Journal of Physics: Condensed Matter (First Track Comm.) **24**, 182201 (2012). Preprint at arXiv:1110.3834.

36. **Tanmoy Das**, R. S. Markiewicz, A. Bansil. *Reconstructing the bulk Fermi surface and the superconducting gap properties from Neutron Scattering experiments.*
Physical Review B **85**, 064510 (2012). Preprint at arXiv:1110.0756.

37. S. Basak, **Tanmoy Das**, H. Lin, R. S. Markiewicz, A. Bansil. *Coexisting pseudogap, charge-transfer-gap, and Mott-gap energy scales in the resonant inelastic x-ray scattering spectra of electron-doped cuprate superconductors.*
Physical Review B **85**, 075104 (2012). Preprint at arXiv:1202.1599.

38. **Tanmoy Das**, A. V. Balatsky. *Two energy scales in the magnetic resonance spectrum of electron and hole doped pnictide superconductors.*
Physical Review Letters **106**, 157004 (2011). Preprint at arXiv:1103.5787.

39. **Tanmoy Das**, A. V. Balatsky. *Stripes, spin resonance and nodeless d-wave superconductivity in Fe_2Se_2-based layered superconductors*.
Physical Review B **84**, 014521 (2011). Preprint at arXiv:1101.6056.

40. **Tanmoy Das**, A. V. Balatsky. *Modulated superconductivity due to vacancy and magnetic order in $A_xFe_{2-x/2}Se_2$ [A=Cs, K, (Tl,Rb), (Tl,K)] iron-selenide superconductor.*
Physical Review B **84**, 115117 (2011). Preprint at arXiv:1106.3289.

41. **Tanmoy Das**, J.-X. Zhu, M. J. Graf. *Local suppression of the superfluid density of $PuCoGa_5$ in the Swiss Cheese model.*
Physical Review B **84**, 134510 (2011). Preprint at arXiv:1105.5109.

42. H. Lin, **Tanmoy Das**, L. A. Wray, S.-Y. Xu, M. Z. Hasan, A. Bansil. *An Isolated Dirac cone on the surface of ternary tetradymite-like topological insulators.*
New Journal of Physics **13**, 09500513 (2011).

43. Y. J. Wang, H. Lin, **Tanmoy Das**, M. Z. Hasan, A. Bansil. *Topological insulators in the quaternary chalcogenide compounds and ternary famatinite compounds.*
New Journal of Physics **13**, 085017 (2011). Preprint at arXiv:1106.3316.

44. **Tanmoy Das**, R. S. Markiewicz, A. Bansil. *Strong correlation effects and optical conductivity in electron doped cuprates.*
Europhysics Letters **96**, 27004 (2011), Preprint at arXiv:0807.4257.

45. T. Ahmed, **Tanmoy Das**, J. J. Kas, H. Lin, B. Barbiellini, F. D. Vila, R. S. Markiewicz, A. Bansil, J. J. Rehr. *X-ray absorption near-edge spectra of overdoped $La_{2-x}Sr_xCuO_4$ high-T_c superconductors*.
Physical Review B **83**, 115117 (2011). Preprint at arXiv:1101.5451.

46. A. Bansil, S. Basak, **Tanmoy Das**, H. Lin, M. Lindroos, J. Nieminen, I. Suominen, R.S. Markiewicz. *Interplay of matrix element, self-energy and geometric effects in various spectroscopies of the cuprates.*
Journal of Physics and Chemistry of Solids **72**, 341 (2011).

47. **Tanmoy Das**, R. S. Markiewicz, A. Bansil. *Optical model-solution to the competition between a pseudogap phase and a Mott-gap phase in high-temperature cuprate superconductors*.
Physical Review B **81,** 174504 (2010). Preprint at arXiv:1002.4188.

48. **Tanmoy Das**, R. S. Markiewicz, A. Bansil. *Emergent non-Fermi-liquid behavior due to Fermi surface reconstruction in the underdoped cuprate superconductors*.

Physical Review B **81,** 184515 (2010). Preprint at arXiv:1004.3047.

49. R. S. Markiewicz, **Tanmoy Das**, A. Bansil. *Failure of t-J models in describing doping evolution of spectral weight in x-ray scattering, optical and photoemission spectra of the cuprate.*
Physical Review B **82**, 224501 (2010). Preprint at arXiv:1011.2141.

50. R. S. Markiewicz, **Tanmoy Das**, S. Basak, A. Bansil. *Intermediate coupling model of cuprates: adding fluctuations to a weak coupling model of pseudogap and superconductivity competition*.
Journal of Electron Spectroscopy and Related Phenomena **181**, 23 (2010). Preprint at arXiv:1002.0106.

51. S. Basak, **Tanmoy Das**, Hsin Lin, J. Nieminen, M. Lindroos, R.S. Markiewicz, A. Bansil. *Origin of the high-energy kink or the waterfall effect in the photoemission spectrum of the $Bi_2Sr_2CaCu_2O_8$ high-temperature superconductor*.
Physical Review B **80,** 214520 (2009).

52. **Tanmoy Das**, R.S. Markiewicz, A. Bansil. *Competing order scenario of two-gap behavior in hole doped cuprates.*
Physical Review B 77, 134516 (2008). Preprint at arXiv:0711.0480.

53. **Tanmoy Das,** R.S. Markiewicz, A. Bansil. *Superconductivity and topological Fermi surface transitions in electron-doped cuprates near optimal doping.*
Journal of Physics and Chemistry of Solids **69**, 2963, (2008). Preprint at arXiv:0711.1504.

54. **Tanmoy Das**, R.S. Markiewicz, A. Bansil. *Nodeless d-wave superconducting pairing due to residual antiferromagnetism in underdoped $Pr_{2-x}Ce_xCuO_{4-\delta}$.*
Physical Review Letters **98**, 197004 (2007). Preprint at arXiv:0704.0956.

55. **Tanmoy Das**, R.S. Markiewicz, A. Bansil. *Nonmonotonic $d_{x^2-y^2}$ gap in electron-doped $Pr_{0.89}LaCe_{0.11}CuO_4$: Evidence of coexisting antiferromagnetism and superconductivity?*
Physical Review B **74**, 020506 (2006). Preprint at arXiv:0604213.

56. **Tanmoy Das**, S. Deb, A. Mookerjee. *Study of electronic structure and elastic properties of transition metal and actinide carbides.*
Physica B **367**, 6 (2005).

Submitted Papers (under consideration)

57. A. Bansil, H. Lin, **Tanmoy Das**, Topological band theory,
Review of Modern Physics (2014).

58. Y. Lu, W. Xu, M. Zeng, G. Yao, L. Shen, M. Yang, Z. Luo, F. Pan, Ke Wu, **Tanmoy Das**, P. He, J. Jiang, Y. Feng, H. Lin, X.-sen Wang, *Emergence of large gap topological insulator in self-assembled ultra-thin X Films,*
Nature Communications (2014).

59. R. S. Dhaka, **Tanmoy Das,** M. Shi, Milan, N, Plumb, K. Dului, J. Mesot, *Direct observation of metal-insulator transition in the NdNiO3 thin film,*

Nature Communications (2014)

60. L.-Zi Yao, Z.-Q. Huang, Yu-T. Liu, F.-C. Chuang, **Tanmoy Das**, H. Lin, A. Bansil, P*rediction of large gap two-dimensional topological insulators in single AB bilayers,* Nano Letters (2013).

61. **Tanmoy Das**, *Spin-orbit density wave: A nonmagnetic phase applicable to the hidden order phase in URu_2Si_2.*
Invited special issue paper submitted to Philosophical Magazines (2013).

62. **Tanmoy Das**, R. S. Markiewicz, A. Bansil, *Intermediate coupling model of cuprates.*
Invited review paper submitted to Advances in Physics (2013).

63. **Tanmoy Das**, *Nodeless superconducting gap induced by a competing odd-parity Fulde-Ferrel-Larkin-Ovchinnikov superconductivity in deeply underdoped cuprates.*
Physical Review Letters (2013). Arxiv:1312.0544.

64. **Tanmoy Das**, J.-X. Zhu, M. J. Graf, *Nodal $s^{\pm}$ pairing symmetry in the Pu-based 115 high-temperature superconductor family.*
Under review in PNAS (USA) (2013). Arxiv:1311.6410.

Peered-reviewed Conference Papers

1. **Tanmoy Das**. *Pairing symmetries of several families of iron-based superconductors and some similarities with cuprates and heavy-fermions.*
Europhysics Journal: Web of Conference **23**, 00014 (2012). Preprint at arXiv:1112.1004.

2. **Tanmoy Das**, T. Durakiewicz, J.-X. Zhu, J. J. Joyce, M. J. Graf. *Material specific correlation effect in several actinides.*
MRS proceeding **1444**, 169 (2012).

Conference Session Organizer and Chair

Organizer and chair
2014 – 'Emergent states driven by spin-orbit coupling', APS March meeting, Denver.
2014 – 'Emergent superconductivity and magnetism in the interfaces and superlattices', International conference on superconductivity and magnetism, Antalya, Turkey.
Chair
2013 – Spectroscopy of Novel Superconductivity (SNS), Berkeley, CA.
2012 – Gordon Conference and Seminar, Boston, MA.

Invited Conference Talks

1. *A new form of staggered spin-orbit order driven in Coulomb interaction in 2D systems,* Symposium "Low dimensional order mediated by interfaces", Hannover, Germany, April 2015.

2. *Interaction induced staggered spin-orbit order in two-dimensional electron gas,*

APS March Meeting, Denver, CO, March (2014).

3. *Spin-orbit density wave: A non-magnetic spin-orbit entangled phase in two-dimensional systems,*
   International Conference on Superconductivity and Magnetism (ICSM) 2014, Ankara, Turkey (2014).

4. *Spin-orbit density wave in the hidden order state in URu_2Si_2.*
   Workshop on Hidden Order, Superconductivity and Magnetism in URu_2Si_2, Lorentz Center of Leiden University, Netherlands, November (2013).

5. *Emergent Fermi-liquid physics in correlated materials within an intermediate coupling model.*
   CORPES'13, Hamburg, Germany, July 2013.

6. *Evidence of Spin-fluctuation Induced High-energy Anomalies in Actinide Compounds.*
   MRS Spring Meeting, San Francisco, CA, USA, April 2011.

Invited Seminars and Colloquia

7. *Toward a universality between various classes of unconventional superconductors,*
   Nanyang Technological Institute, Singapore, October 2014.
   .
8. *Engineering three dimensional topological insulator, Weyl semimetals in layer by layer approaches,*
   Graphene Research Center, National University of Singapore, Singapore, February, 2014.

9. *Engineering topological insulator, Weyl semimetals, and spin-orbit order in Rashba bilayer heterostructure.*
   Institute of Physics (IOP), Chinese Academy of Science, Beijing, China. November (2013).

10. *Engineering topological insulator in Rashba bilayer heterostructure.*
    Paul Scherrer Institute, Switzerland, November (2013).

11. *Momentum and energy resolved electronic correlation in strongly correlated materials within an intermediate coupling model.*
    Tata institute for fundamental research (TIFR), Mumbai, India, September (2013).

12. *Engineering three dimensional topological insulators, Weyl semimetals, and superconductors in layer by layer approaches*.
    Indian Institute of Science, Bangalore, India, September (2013).

13. *Spin-orbit density wave: A nonmagnetic hidden order phase applicable to the hidden order state in URu_2Si_2 and other spin-orbit coupled systems.*
    Karlsruhe Institute of Technology, Karlsruhe, Germany, July, 2013.

14. *Intermediate coupling model for correlated electrons.*
    University of Tennessee & University of Nebraska, USA, February and March 2013.

15. *Spin-orbit density wave: A new paradigm of broken symmetry phase of matter.*

University of California-Davis, CA, USA. January 2012.

16. *Origin of pressure induced novel superconductivity in $A_yKe_{(2-x)}Se_2$ [A=K, Tl,Rb].*
Royal Holloway, University of London, UK, September 2012.

17. *Evidences for intermediate coupling strength in cuprates, pnictide and heavy-fermion systems.*
Northwestern University, Illinois, November 2011.

18. *Magnetic quasiparticle scattering mechanism of spin-resonance behavior and its relationship with quasiparticle interference pattern in high-Tc superconductors.*
California Institute of Technology, Pasadena, CA, May 2011.

19. *Spin-fluctuation mechanism of low- and high-energy kinks in high-temperature superconductors,*
University of Colorado-Boulder, Boulder, CO, October 2010.

20. *Intermediate coupling model of cuprates: reconciling photoemission, optical and other inelastic scattering spectroscopies,*
University of Washington-Seattle, Seattle, WA, March 2010.

21. *A unified intermediate coupling model of high-temperature superconductors and its applications to spectroscopies,*
Los Alamos National Laboratory, Los Alamos, NM, October 2010.

22. *Nodeless d-wave superconducting pairing due to residual antiferromagnetism in underdoped $Pr_{2-x}Ce_xCuO_{4-\delta}$,*
Harvard University, Cambridge, MA, February 2008.

23. *Nonmonotonic $d_{x^2-y^2}$ superconducting gap in electron-doped $Pr_{0.89}LaCe_{0.11}CuO_4$: Evidence of coexisting antiferromagnetism and superconductivity?,*
S.N. Bose National Centre for Basic Science, Kolkata, India, June, 2006.

24. *Nonmonotonic d-wave gap in a coexisting antiferromagnetic superconducting state*,
Indian Association for the Cultivation of Science, Kolkata, India, June, 2006.

Contributed Talks

25. *Possibility of nodeless s^{+-} pairing symmetry in plutonium-based 115 superconductors*, M. J. Graf, **Tanmoy Das**, J.-X. Zhu, APS March Meeting, Denver, CO, USA, March 2014.

26. *Emergent Fermi liquid in correlated actinides systems within an intermediate coupling model.* **Tanmoy Das**. Actinides-2013, Karlsruhe, Germany, July (2013).

27. *Engineering three dimensional topological insulator in layered heterostructure.* **Tanmoy Das**, A. V. Balatsky**,** APS March Meeting, Baltimore, MD, USA, March 2013.

28. *Topological dangling bonds with large spin-splitting and enhanced spin polarization on the surface of Bi_2Se_3.* H. Lin, **Tanmoy Das**, Y. Okada, M.. C. Boyer, W. D. Wise, M. Tomasik,

Bo Xhen, E. W. Hudson, W. Zhou, V. Madhavan, C.-Y. Ren, H. Ikuta, A. Bansil, APS March Meeting, Baltimore, MD, USA, March 2013.

29. *Stability of Weyl metals under impurity scattering,* Z. Huang, **Tanmoy Das**, A. V. Balatsky, D. P. Arovas, APS March Meeting, Baltimore, MD, USA, March 2013.

30. *Imaging electronic hot spots in the spectral function of the actinide UCoGa5.* M. J. Graf, **Tanmoy Das**, T. Durakiewicz, J.-X. Zhu, J.. J. Joyce, J. L. Sarrao, APS March Meeting, Baltimore, MD, USA, March 2013.

31. *Hidden topological order in URu_2Si_2.* **Tanmoy Das**, International Conference on Magnetism (ICM) with Strongly Correlated Electron Systems (SCES), Busan, South Korea, July, 2012.

32. *Spin-orbit coupling density wave and hidden topological in URu_2Si_2.***Tanmoy Das**. Villa Conference on Topological Insulators, Orlando, Florida, USA, April, 2012.

33. *Search for new topological insulators,* Hsin Lin, **Tanmoy Das**, Y.J. Wang, S.Y. Yang, L. A. Wray, M. Z. Hasan, A. Bansil. International Conference Young Researcher or Advanced Material, Singapore, July, 2012.

34. *Microscopic description of the electronic nematicity observed in YBCO superconductor.* **Tanmoy Das**. International Conference on Superconductivity and Magnetism, Istanbul, Turkey, April 2012.

35. *Staggered spin-orbit coupling induced hidden order state in heavy-fermion metal URu_2S_2,* **Tanmoy Das**, American Physical Society March Meeting, Boston, MA, USA, February 2012.

36. *High-energy dispersion anomalies in actinide compounds,* **Tanmoy Das**, T. Durakiewicz, J.-X. Zhu, J.J. Joyce, M. J. Graf, American Physical Society March Meeting, Boston, MA, USA, February 2012.

37. *Nodeless d-wave Superconductivity and spin resonance in iron-selenide superconductors,* A. V. Balatsky, **Tanmoy Das**, American Physical Society March Meeting, Boston, MA, USA, February 2012.

38. *Search for new topological insulators: ternary Li_2AgSb-class semiconductors and related compounds,* H. Lin, **Tanmoy Das**, Y.J. Wang, L.A. Wray, S.-Y. Xu, M.Z. Hasan, A. Bansil, American Physical Society March Meeting, Boston, MA, USA, February 2012.

39. *Gap structure probed by field-angle resolved thermal oscillations in $CeCoIn_5$ superconductor,* M. J. Graf, **Tanmoy Das**, A. B. Vorontsov, I. Vekhter, American Physical Society March Meeting, Boston, MA, USA, February 2012.

40. *Ab initio calculations of electronic fingerprints of DNA bases on Graphene,* T. Ahmed, J. J. Rehr, S. Kilina, **Tanmoy Das**, J. T. Haraldsen, A. V. Balatsky, American Physical Society March Meeting, Boston, MA, USA, February 2012.

41. *Evidence of strong correlations at the Van Hove singularity in the scanning-tunneling spectra of superconducting $Bi_2Sr_2CaCu_2O_8$ single crystals,* A. Bansil, J. Nieminen, I. Suominen,

Tanmoy Das, R. S. Markiewicz, American Physical Society March Meeting, Boston, MA, USA, February 2012.

42. *Topological insulators in the quaternary chalcogenide compounds and ternary famatinite compounds*, Y. J. Wang, H. Lin, **Tanmoy Das**, M.Z. Hasan, A. Bansil, American Physical Society March Meeting, Boston, MA, USA, February 2012.

43. *Material dependence of spin-excitation spectra and the role of Fermi surface and superconducting gap symmetry in high-temperature superconductors*, **Tanmoy Das**, A. V. Balatsky, Eurasia Pacific Summer School and Conference of Strongly Correlated Electrons, Turunc-Marmaris, Turkey, July 2011.

44. *Multiband effect on the magnetic resonance spectrum of pnictide superconductors*, **Tanmoy Das**, A. V. Balatsky, American Physical Society March Meeting, Dallas, TX, USA, March 2011.

45. *Origin of magnetic resonance spectrum in cuprate high-temperature superconductors and related issues*, A. Bansil, **Tanmoy Das**, R. S. Markiewicz, American Physical Society March Meeting, Dallas, TX, USA, March 2011.

46. *ARPES lineshapes, coherent to incoherent ratios, and the waterfall self-energy of Bi2212 cuprate superconductors*, Q. Wang, Z. Sun, **Tanmoy Das**, A. V. Balatsky, E. Rotenberg, H. Berger, H. Eisaki, Y. Aiura, D. Dessau, American Physical Society March Meeting, Dallas, TX, US, March 2011.

47. *Search for New Topological Insulators*, H. Lin, L.A. Wray, S.-Y. Xu, M.Z. Hasan, **Tanmoy Das**, Y.J. Wang, R.S. Markiewicz, A. Bansil, American Physical Society March Meeting, Dallas, TX, US, March 2011.

48. *First principles computation of dynamical structure factor in real and momentum space in cuprates*, Y. J. Wang, B. Barbiellini, H. Lin **Tanmoy Das**, S. Basak, P. E. Mijnarends, S. Kaprzyk, R.S. Markiewicz, A. Bansil, American Physical Society March Meeting, Dallas, TX, US, March 2011.

49. *Strong correlation and matrix element effects in ARPES and RIXS spectra of cuprates*, S. Basak, **Tanmoy Das**, Hsin Lin, R. S. Markiewicz, A. Bansil, International Conference on Strongly Correlated Electron Systems, New Mexico, 2010.

50. *Emergent non-Fermi liquid in the pseudogap phase of the underdoped cuprates*, **Tanmoy Das,** R.S. Markiewicz, A. Bansil, American Physical Society March Meeting, Portland, March 2010.

51. *Modification of RIXS spectra of cuprates due to self energy and matrix element effects*, Susmita Basak, **Tanmoy Das**, Hsin Lin, R. S. Markiewicz, A. Bansil, American Physical Society March Meeting, Portland, March 2010.

52. *Dynamical structure factor computations in extended momentum space in electron doped cuprates*, Yung Jui Wang, B. Barbiellini, Hsin Lin, **Tanmoy Das**, Susmita Basak, P. E. Mijnarends, S. Kaprzyk, R. S. Markiewicz, A. Bansil, American Physical Society March Meeting, Portland, March 2010.

53. *Fermi liquid description of XAS in overdoped LSCO*, Towfiq Ahmed, John J. Rehr, Joshua J Kas, **Tanmoy Das**, Hsin Lin, R.S. Markiewicz, B. Barbiellini, A. Bansil, American Physical Society March Meeting, Portland, March 2010.

54. *Strong correlation effects and optical conductivity in electron doped cuprates*, **Tanmoy Das,** R.S. Markiewicz, A. Bansil, American Physical Society March Meeting, Pittsburgh, March 2009.

55. *Mott gap collapse in the cuprates apparent or real?*, R.S. Markiewicz, **Tanmoy Das**, A. Bansil, American Physical Society March Meeting, Pittsburgh, PA, March, 2009.

56. *ARPES matrix element and the waterfall effect in the cuprates,* S. Basak, **Tanmoy Das**, J. Nieminen, M. Lindroos, Hsin Lin, R.S. Markiewicz, A. Bansil, American Physical Society March Meeting, Pittsburgh, PA, March, 2009.

57. *Strong correlation effects and optical conductivity in electron doped cuprates (High-temperature superconductor)*, **Tanmoy Das,** R.S. Markiewicz, A. Bansil, Graduate Journal Club, Northeastern University, Boston, March 2009.

58. *A competing order scenario of two-gap behavior in hole doped cuprates*, **Tanmoy Das,** R.S. Markiewicz, A. Bansil, American Physical Society March Meeting, New Orleans, March 2008.

59. *Magnon corrections to cuprate self-energy*, R. S. Markiewicz, **Tanmoy Das,** A. Bansil, American Physical Society March Meeting, New Orleans, March 2008.

60. *Nodeless d-wave superconducting pairing in antiferromagnetic underdoped* $Pr_{2-x}Ce_xCuO_{4-\delta}$, **Tanmoy Das,** R.S. Markiewicz, A. Bansil, American Physical Society March Meeting, Denver, Colorado, March 2007.

61. *Nodeless d-wave superconducting pairing and non-BCS like superfluid density due to residual antiferromagnetism in electron doped cuprates*, **Tanmoy Das,** R.S. Markiewicz, A. Bansil, SNS2007 Yamada Conference LXI, Sendai, Japan, August 2007.

62. *Antiferromagnetic superconducting state in the electron-doped cuprates?*, **Tanmoy Das,** R.S. Markiewicz, A. Bansil, American Physical Society March Meeting, Baltimore, MD, March, 2006.

Contributed Posters

63. *Emergent Fermi liquid physics in correlated materials within an intermediate coupling model*. **Tanmoy Das.** Strongly Correlated Electron Systems (SCES), Tokyo, Japan, August, 2013 (scheduled).

64. *Superconductivity in correlated Fermi liquid systems of cuprates, pnictides, and actinides.* **Tanmoy Das.** Spectroscopies for Novel Superconductors (SNS-2013) at Berkeley, Ca, USA, June 2013.

65. *Two metal-insulator transitions in iridates,* **Tanmoy Das**, APS March Meeting, Baltimore, MD, USA, March 2013.

66. *Electron-like Fermi surface and in-plane anisotropy arising from the chain state in YBCO superconductors.* **Tanmoy Das**, Materials and mechanisms of superconductivity, Washington DC, USA, July 2012.

67. *Nodeless d-wave in superconductivity in layered iron-selenide superconductors and magnetic resonance.* **Tanmoy Das**, A. V. Balatsky, Materials and mechanisms of superconductivity, Washington DC, USA, July 2012.

68. *Importance and details of the spin excitation spectra in high-Tc pnictide superconductors.* **Tanmoy Das**, A V. Balatsky. International conference on magnetism with strongly correlated electron systems, Bexco, Busan, Korea, July 2012.

69. *In-plane anisotropy and Electron-like Fermi surface in the chain state of YBCO.* **Tanmoy Das**. Gordon Research Conference, Boston, MA, USA, June 2012.

70. *Spin-Orbit coupling density wave and hidden topological order in URu_2Si_2.* Tanmoy Das. Gordon Research Seminar, Boston, MA, USA, June 2012.

71. *Spin-Orbit Coupling Density Wave and Its Topological Properties in Heavy Fermion URu_2Si_2.* **Tanmoy Das**, International Conference on Superconductivity and Magnetism, Istanbul, Turkey, April 2012.

72. *Spin-orbit coupling induced hidden order state in URu_2Si_2,* **Tanmoy Das**. Material Research Society Sprint Meeting, San Francisco, CA, USA, March 2012. Received best poster award.

73. *Superconducting gap symmetry and multiple resonances in iron-based superconductors,* **Tanmoy Das**, A. V. Balatsky, SCES 2011, Cambridge, UK September 2011.

74. *Visualizing local spin and charge structure of heavy-fermion compounds though spatially NMR spectra,* **Tanmoy Das**, J.-X. Zhu, M. J. Graf, SCES 2011, Cambridge, UK September 2011.

75. *Double spin resonances in pnictide due to the effects of multiband and multiple superconducting gaps,* **Tanmoy Das**, A. V. Balatsky, Multiorb 2011, Cargese, France, August 2011.

76. *Spatially resolved NMR spectra for the Swiss cheese model in heavy fermion $PuCoGa_5$ superconductor,* **Tanmoy Das**, J.-X. Zhu, A.V. Balatsky, M. J. Graf, American Physical Society March Meeting, Dallas, TX, US, March 2011.

77. *Reconciliation of the strong correlation aspects of cuprates across photoemission, optical, x-ray absorption and other spectroscopies,***Tanmoy Das**, R. S. Markiewicz, A. Bansil, International Conference on Spectroscopies in Novel Superconductors, Shanghai, China, May 2010.

78. *Tunneling channels and matrix element effects in scanning tunneling spectroscopy of $Bi_2Sr_2CaCu_2O_{8+x}$ at different values of hole doping,* J. Nieminen, I. Suominen, H. Lin, **Tanmoy Das**, R. S. Markiewicz, A. Bansil, International Conference on Spectroscopies in Novel Superconductors, Shanghai, China, May 2010.

79. *Origin of the high-energy kink in $Bi_2Sr_2CaCu_2O_8$ and $Bi_2Sr_2CuO_6$: Electron correlation and matrix element effects,* M. Lindroos, S. Basak, **Tanmoy Das**, H. Lin, J. Nieminen, R. S. Markiewicz, A. Bansil, International Conference on Spectroscopies in Novel Superconductors, Shanghai, China, May 2010.

80. *Self-energy corrections and matrix element effects in the RIXS spectra of cuprates,* S. Basak, **Tanmoy Das**, Hsin Lin, R.S. Markiewicz, A. Bansil, International Conference on Spectroscopies in Novel Superconductors, Shanghai, China, May 2010.