

Biodata

1. **Name:** Dr. Satyabrata Patnaik

2. **Mailing address:** Professor, School of Physical Sciences
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3. **Date of Birth:** 3rd May 1969

4. **Specialization:** Experimental Condensed Matter Physics, Material Science

5. **Educational Qualification:**

Degree	University	Year	Subjects
M. Sc.	IIT Delhi	1991	Physics
M. Tech	IIT Kanpur	1993	Nuclear Engg. & Tech.
Ph.D.	IIT Kanpur	2000	Physics

6. **Professional recognition, awards, fellowships received:**

- Fulbright – Nehru Senior Research Fellowship (2011)
- Commonwealth Fellowship, University of Cambridge UK (2009)
- SCOPUS Young Scientist Award (2008)
- DAE Young Achiever Award (2006)
- Merrill – Lynch innovation award (2001)
- National Scholarship (1989 – 1991)
- State Merit Scholarship (1980 -1989)
- Citations for published research work (Google Scholar): over **5000**

7. **Administrative responsibilities:**

- Dean, School of Physical Sciences, JNU (2018-2020)
- Dean, School of Engineering, JNU (January 2020- January 2021)
- Academic Council member of Raman Research Institute, Bengaluru (2018-20)

- Academic Council Member of IUCAA, Pune (2018 -_
- Academic Council Member of College of Military Engineering, Pune) (2018-20)
- Board Member of Central University, Punjab (2019-)

8. Theses:

Ph.D. Thesis: Effects of granularity and correlated pinning disorder on vortex dynamics in highly oriented platelets of Bismuth based cuprate superconductors (Supervisor: **Prof. R. C. Budhani**)

M.Tech. Thesis: Field coil specifications for ECRH assisted start up in a TOKAMAK (Supervisors: **Prof. K. Sriram** and **Prof. S. Chaturvedi**(IPR))

M.Sc. Thesis: Characterization studies of iron doped calcium borate glasses (Supervisor Prof. **R. G. Mendiratta**)

9. Details of professional training:

- Associate Researcher, Applied Superconductivity Center, University of Wisconsin-Madison, USA (with Prof. David Larbalestier) 2000 -2002.
- Visiting Scientist, Laboratoire des Physique des solides, Université Paris Sud, Orsay, France (with Prof. Helene Raffy and Marcin Konczykowski) October 1998.
- Academic Staff Fellow, University of Cambridge, Cambridge, UK (with Prof. Judith Driscoll) 2009 – 2010.
- Senior Research Fellow, University of Wisconsin-Madison (With Prof. C. B. Eom) 2011 – 2012
- Visiting Research Professor, Institute of Physics, Chinese Academy of Sciences, Beijing (With Prof. Xingjiang Zhou) June-July 2015.

10. Details of employment:

Assistant Professor, School of Physical Sciences, JNU, New Delhi July 2002-
August 2008

Associate Professor, School of Physical Sciences, JNU New Delhi Aug 2008-

11. Courses taught:

Electromagnetic Theory, Solid State Physics, Special Topics in Condensed Matter
Physics, Experimental Physics Lab –I and III, and Atoms and Molecules.

12. Ph.D. Thesis supervised:

1) **Dr. Somdatta Kaushik** (Scientist, UGC-CSR Mumbai)

Thesis Title : Effects of pinning disorder on multiband transport properties of
superconducting Magnesium Diboride

2) **Dr. Anil. K. Singh** (Assistant Professor, NIT Rourkela)

Thesis Title: Study of magneto-electric coupling in novel spin frustrated multiferroics

3) **Dr. D. Srikala** (Assistant Professor, Delhi University)

Thesis title: Synthesis and characterization of magnetic system in Nano-Scale

4) **Dr. Shivjee Singh** (RA, Oxford University, UK)

Thesis Title: Study of transport and magnetization properties of ferropnictide
superconductors.

5) **Dr. Gyaneswar Sharma** (Assistant Professor, Govt. College, Etawa, UP)

Thesis title: Studies on magnetic structure driven ferroelectricity in transition metal oxides

6) **Dr. Jitendra Saha** (RA, Upasala University, Sweden)

Thesis title: Study of multiferroicity in oxide heterostructures

7) **Dr. Shruti** (Assistant Professor, Govt College, Jhansi, UP)

Thesis title: Exploring novel superconductivity in oxy – ferropnictides

8) **Dr. Vishal Maurya** (NPDF, IIT Delhi)

Thesis title: Synthesis and characterization of superconductors derived from topological
insulators.

9) **Dr. Rohtash Kumar** (Assistant Professor (ad hoc), Delhi University)

Thesis Title: Nanostructure-Dielectric properties relationship in Lead-free relaxor ferroelectrics using Transmission Electron Microscopy

10) **Dr. Prakriti Neha** (University of Bologna, Italy)

Thesis title: Superconductivity in Pnictides, Selenides and Gallides; New Insights

11) **Dr. Pawan Kumar** (RA, JNU)

Thesis Title: Emergent Properties of Dirac and Weyl Semimetals

12) **Dr. Shivani Chaudhary** (RA, JNU)

Thesis title: Study of Magnetoelectric Response in Honeycomb Oxides

Current Ph.D. students: Mr. Ganesh Gurjar, Mr. Vipin Nagpal, Mr. Karn Singh Jat, Mr. Amar Dagar, Mainpal Singh, Pallavi Saha, Mr. Pradeep Kumar, Ms. Priya Das

13. Significant contribution over the last years

We have made wide ranging contributions to the fields of multiferroics, superconductivity and nano-magnetism over the last years.

A. Multiferroics :

The sub-area in the broad field of multiferroics where we have extensively contributed in the recent past, deals with multiferroic materials where the electric polarization is caused by exotic magnetic correlations rather than non-centro-symmetric crystal structure. In particular, we have studied such effects in frustrated magnetic systems with non-collinear (Dzyaloshinskii-Moria type interaction) and collinear (magnetostriction driven) magnetic orderings.

1. We have established substantial magneto-electric coupling in $\text{Bi}_2\text{Fe}_4\text{O}_9$ near room temperature (**Appl. Phys. Lett.** 92, 132910 (2008)). This work on $\text{Bi}_2\text{Fe}_4\text{O}_9$ was highlighted in **Nature-Asia** (<http://www.natureasia.com/asia-materials/highlight.php?id=244>).
2. Our recent work on magnetic field dependent neutron scattering experiments in hexagonal YMnO_3 delineates the dominance of magneto-elastic coupling over and above magneto-electric coupling in this frustrated magnet (**Phys. Rev. B** 81, 184806 (2010)).
3. We have identified a new magnetic field driven ferroelectric phase in spin frustrated $\text{Ni}_3\text{V}_2\text{O}_8$ (**Europhys. Lett.** 86, 57001 (2009)).
4. The central challenge with magnetic structure driven ferroelectricity is that such emergent behaviour remains a low - temperature phenomena (typically below ~ 40 K). We have recently provided strong evidence for robust multiferroic effects in a collinear magnetic-chain double perovskite Y_2CoMnO_6 at a temperature range above the industrial benchmark of liquid nitrogen temperature (**Appl. Phys. Lett.** 103, 012903 (2013)).
5. Our study on lattice mismatched YMnO_3 thin films established that its anti-ferromagnetic correlation is tuneable through strain (**J. Appl. Phys.** 106, 014109 (2009)).
6. Recently we have initiated a strong program on thermoelectric materials based on half -Huesler compounds. We have developed experimental facilities for in-house measurement of Seebeck Coefficient and Thermal conductivity.

B. Superconductivity

Over the last five years our group has worked extensively on superconducting materials in three generic systems, e.g. Diborides, Oxypnictides, and Bismuth-sulphides. In strong collaboration with Prof. A. K. Ganguli's Chemistry Lab at IIT Delhi, we have published over 15 papers on Oxypnictides. Our important works in this field are as follows;

1. Demonstration of enhancement in transition temperature, critical current density and critical fields by simultaneous substitution of Y in place of Ce and F in place of O in the semimetal CeOFeAs. Such multiple benefits are achieved by optimization of three independent parameters; higher chemical pressure, selective tuning of multi-band scattering mechanism and superior vortex pinning properties of Y_2O_3 (**Appl. Phys. Lett.** 95, 262507 (2009)).
2. We were the first group to achieve induction of superconductivity due to Co doping in place of Fe in FeAs layers of CeOFeAs (**Solid State Communications** 149, 181 (2009). This is exciting because in cuprates any amount of tinkering in the CuO layers would always destroy superconductivity!
3. Two fold increase in upper critical field in lanthanum based oxypnictides is achieved by tuning inter and intra band scattering through simultaneous doping of K in place of La and F in place of O (**Europhys. Lett.** 84, 57003 (2008).
4. Determination of basic superconducting parameters in layered oxysulphide $\text{Bi}_4\text{O}_4\text{S}_3$ (**J. Am. Chem. Soc.** 134 16504 (2012)).
5. Our current research focuses on the identification of topological superconductivity in Sr-intercalated Bi_2Se_3 (Phys. Rev. B **Phys. Rev. B.**, **92**, 020506R (2015) and [arxiv/1804.08998](https://arxiv.org/abs/1804.08998))

C. Magnetism in Nano-scale

It is well known that robust ferromagnetism at room temperature in cobalt and iron disappears in the nano - scale. Using oxygen passivation techniques, our group has synthesized and studied exchange bias effects in cobalt nano-spheres and nano-cubes. Their main contribution in this area would be the achievement of about an order of magnitude enhancement in the blocking temperature by exchange biasing ferromagnetic nano-spherical core (Co) with an antiferromagnetic shell (CoO). This result has strong implication towards eventual application of these nano-magnets at room temperature (**J. Phys.**

Chem C 112 36, 13882 (2008), JNN 9, 5627 (2009), JMMM 324, 2512 (2012)). We have also attempted to study diluted magnetic semiconductors in nano-scale by incorporating cobalt onto PbSe nano-particles. Using wire explosion technique they have synthesized Niobium nano-particles of dimension smaller than bulk coherence length and studied the variation in superconducting (diamagnetic) transition temperature using magnetic penetration depth measurements.

D. Magneto-resistance in Weyl and Dirac semimetals

The phenomena of magneto-resistance finds wide application in industry particularly in the areas of magnetic storage devices and data read-heads. In the recent past exceptional magneto-resistance has been observed in Weyl and Dirac semimetals such as NbP, WTe₂, TaAs and Cd₃As₂. We have reported on the origin of such high magnetoresistance in NbP (Scientific Report **Scientific Reports**, 7, 46062 (2017)) and TaSb₂ ([arxiv/1807.08434](https://arxiv.org/abs/1807.08434)).

14. Externally funded projects:

Title	Sponsor	Amount	From Date (Month-Year)	To Date (Month-Year)
Electronic anisotropy of MgB ₂	DST	11.3 Lacs	2005	2008
Study of magnetoelectric coupling and its correlation with crystal structure in doped and pure YMnO ₃	UGC-CSR	1.05 Lacs	2008	2010
Study of penetration depth and electronic anisotropy in Oxypnictide superconductors	UGC	11.98 Lacs	2009	2014.
Magneto-transport studies in weyl semimetal and	DST DERB File no: EMR/2016/003998/P HY	48,14,377.00	28 March 2017	2019

doped topological insulator				
Growth and characterization of thin film devices relevant for genomics and superconductivity applications	UPE II (UGC) Project ID: 129	11,00,000.00	01 April, 2014	2019
Upgradation of metallurgical characterization facilities in CIF-SPS	UPE II (UGC) Project ID: 137	11,00,000.00	01 April 2014	2019
Optimization of Heusler based Nano-composite Materials for Thermoelectric Energy Conversion	INDO-RUSSIAN DST-RFBR		January 2019	2021
CONCEPT	DST Nano -Mission		2020	2025

15. Infrastructure development

With generous support from UGC and DST we have been able to nucleate a strong material science program at JNU. We have access to polycrystalline, thin film, and single crystal sample growth and varied transport and magnetization characterization over broad range of temperature (300 mK to 700K), Magnetic field (upto 14 Tesla) and pressure (upto 30 kbar). In conjunction with AIRF JNU, we routinely undertake Magneto-resistance, Hall, Specific heat, Thermoelectric power, DC/AC susceptibility, RF penetration depth, Dielectric constant and Electric polarization measurements. We also have in-house access to XRD, HRTEM, SEM/EDAX, and Raman spectroscopy.

16. Publications

Journals

1. *Radio frequency vortex dynamics in oriented platelets of $(\text{Bi-Pb})_2\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_{10}$ superconductor*, S. Patnaik, R. C. Budhani, Y.-L. Yang, and M. Suenaga, **Physica C** 309, 221 (1998).
2. *Apparatus for vortex dynamics studies in high T_c samples using close cycle refrigerator and RF oscillators*, S. Patnaik, K. J. Singh, and R. C. Budhani, **Review of Scientific Instruments** 70, 1494, (1999).
3. *Anisotropy dominated radio frequency vortex dynamics in $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_8$ thick films on silver tapes*, S. Patnaik, R. C. Budhani, and D. W. Hazelton, **Physica C** 325, 210 (1999).
4. *Effects of granularity and strong pinning on high frequency vortex dynamics in $(\text{Bi-Pb})_2\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_{10}$ superconducting platelets*, S. Patnaik, R. C. Budhani, and M. Konczykowski, **Solid State Communications** 113, 109 (2000).
5. *Vortex phases and c-axis correlation in as grown and heavy ion irradiated $(\text{Bi-Pb})_2\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_{10}$ superconducting tapes; A Flux transformer study*, S. Patnaik, R. C. Budhani, M. Konczykowski, Y. -L. Yang, and M. Suenaga, **Superconductor Science and Technology** 13, 1 (2000).
6. *Radio frequency vortex dynamics in heavy ion irradiated $(\text{Bi-Pb})_2\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_{10}$ superconducting platelets*, S. Patnaik, R. C. Budhani, M. Konczykowski, Y. -L. Yang, and M. Suenaga, **Physica C** 349, 155 (2001).
7. *Local Hall-probe-based susceptometry of $\text{Tl}_2\text{Ba}_2\text{CaCu}_2\text{O}_8$ epitaxial films: Critical state and flux dynamics in collinear ac and dc magnetic fields*, L. K. Sahoo, S. Patnaik, R. C. Budhani, and W. L. Holstein, **Physical Review B** 63, 214501 (2001).
8. *Examination of current limiting mechanism in monocoil Ag/BSCCO tapes with high critical current density*, A. Polyanski, M. Feldman, S. Patnaik, J. Jian, X. Cai, D. Larbalestier, K. DeMorvanville, D. Yu and R. Parrella, **IEEE transactions on Applied Superconductivity** 11, 3269 (2001).
9. *Strongly linked current flow in polycrystalline forms of MgB_2* , D. C. Larbalestier, M. Rikel, L. D. Cooley, A. A. Polyanski, J. Y. Jiang, S. Patnaik, X. Y. Cai, D. M. Feldman, A. Gurevich, A. A. Squitieri, M. T. Naus, C. B. Eom, E. E. Helstrom, R. J. Cava, K. A. Regan, N. Rogado, A. Hayward, T. He, J. S. Slusky, P. Khalifah, I. Inumaru, and M. Haas, **Nature** 410, 186 (2001).
10. *Thin film Magnesium Boride superconductor with very high critical current density and enhanced irreversibility field*, C. B. Eom, M. K. Lee, J. H. Choi, L. Blenkey, X. Song, L. D. Cooley, M. T. Naus, S. Patnaik, J. Jiang, M. Rikel, A. Polyanskii, A. Gurevich, X. Y. Cai, S. D. Bu, S. E. Babcock, E. E. Hellstrom, D. C. Larbalestier, N. Rogado, K. A.

- Regan, M. A. Hayward, T. He, J. S. Slusky, K. Inumaru, M. K. Haas, and R. J. Cava, **Nature** 558, 411 (2001).
11. *Electronic Anisotropy, Magnetic Field-Temperature phase diagram and their dependence on resistivity in c-axis oriented MgB₂ thin films*, S. Patnaik, L. D. Cooley, A. Gurevich, A. A. Polyanskii, J. Y. Jiang, X. Y. Cai, A. A. Squitieri, M. T. Naus, M. K. Lee, J. H. Choi, L. Belenky, S. D. Bu, J. Letteri, X. Song, D. G. Schlom, S. E. Babcock, C. B. Eom, E. E. Hellstrom, and D. C. Larbalestier, **Superconductor Science and Technology** 14, 315 (2001).
 12. *Flux Flow of Abrikosov-Josephson Vortices Along Grain Boundaries in High-Temperature Superconductors*, A. Gurevich, M. S. Rzchowski, G. Daniels, S. Patnaik, D. C. Larbalestier, B. M. Hinaus, F. Carillo, and F. Tafuri, **Physical Review Letters** 88(9), 097001/4 (2002).
 13. *Anomalous reentrant inductive response at fractional filling density in heavy irradiated Bi-2212 tapes*, S. Patnaik and R. C. Budhani, **Advances in Cryogenic Engineering**, 48(B), 986-993 (2002).
 14. *Synthesis and Properties of c-axis Oriented Epitaxial MgB₂ thin films*, S. D. Bu, D. M. Kim, J. H. Choi, J. Giencke, S. Patnaik, L. Cooley, E. E. Hellstrom, D. C. Larbalestier, and C. B. Eom, **Applied Physics Letters** 81, 1851 (2002).
 15. *Interfacial structure of Epitaxial MgB₂ grown on (0001) sapphire*, W. Tian, X. Q. Pan, S. D. Bu, D. M. Kim, J. H. Choi, S. Patnaik and C. B. Eom, **Applied Physics Letters** 81, 685 (2002).
 16. *Significant enhancement of irreversibility field in Clear limit bulk MgB₂*, V. Braccinni, L. D. Cooley, S. Patnaik, P. Martrineth, A. Palenzona, A. S. Siri, and D. C. Larbalestier, **Applied Physics Letters** 81, 4577 (2002).
 17. *Local measurement of current density by Magneto-Optical current reconstructions in normally and over pressure processed BiSCCO Superconductors*, S. Patnaik, D. M. Feldmann, A. A. Polianskii, Y. Yuan, J. Jiang, X. Y. Cai, E. E. Hellstrom and D. C. Larbalestier, **IEEE Transactions on Applied Superconductivity** 13, 2930 (2003).
 18. *Critical current limiting factors in post annealed BiSCCO tapes*, J. Jiang, X. Y. Cai, J. G. Chandler, S. Patnaik, Y. Yuan, A. A. Polianskii, E. E. Hellstrom and D. C. Larbalestier, **IEEE Transactions on Applied Superconductivity** 13, 3018 (2003).
 19. *Microstructural and J_c improvements in over pressure processed Ag-Sheathed Bi-2223 tapes*, Y. Yuan, J. Jiang, X. Y. Cai, S. Patnaik, A. A. Polianskii, E. E. Hellstrom, D. C. Larbalestier, R. K. Williams and Y. Huang, **IEEE Transactions on Applied Superconductivity** 13, 2921 (2003).
 20. *Very high upper critical fields in MgB₂ produced by selective tuning of impurity scattering*, A. Gurevich, S. Patnaik, V. Braccinni, K. H. Mielke, X. Song, L. D. Cooley, S. D. Bu, D. M. Kim, J. H. Choi, L. J. Belenky, J. Giencke, M. L. Lee, W. Tian, X. P. Pan, A.

- Siri, E. E. Hellstrom, C. B. Eom, and D. C. Larbalestier, **Superconductor Science and Technology** 17, 278 (2004).
21. *Thermally activated current transport in MgB₂*, S. Patnaik, S. D. Kaushik, A. Gurevich, S. D. Bu, J. Choi, C. B. Eom, D. C. Larbalestier **Physical Review B** 70, 064503 (2004).
 22. *Improved upper critical field in bulk-form magnesium diboride by mechanical alloying with carbon*, B. J. Senkowich, J. E. Glincke, S. Patnaik, C. B. Eom, E. E. Hellstrom, D. C. Larbalestier, **Applied Physics Letters**, 86, 202502 (2005).
 23. *Modification of intergrain connectivity, upper critical field anisotropy and critical current density in ion irradiated MgB₂ films*. S. D. Kaushik, Ravi Kumar, P. K. Mishra, J. Giencke, C. B. Eom and S. Patnaik, **Physica C**, 442, 73 (2006).
 24. *Intergrain connectivity and resistive broadening in the vortex state: a comparison between MgB₂, NbSe₂ and Bi₂Sr₂Ca₂Cu₃O₁₀*, S. D. Kaushik and S. Patnaik, **IEEE transactions in Applied Superconductivity** 17, 3016 (2007).
 25. *Magnetoelectric properties of Bi₂Co₂-xMnO₄ (0 ≤ x ≤ 0.3)*, N Rajeevan , P Pradyumn , D Shukla , Shalendra Kumar , Sunil Arora , Igor Shvets , A Singh , S. Patnaik, **Appl. Phys. Lett.** 92, 102910 (2008).
 26. *Substantial magneto-electric coupling in Bi₂Fe₄O₉*, A. K. Singh, S. D. Kaushik, P. K. Mishra, V. Siriguri, B. Kumar and S. Patnaik, **Appl. Phys. Lett.** 92, 132910 (2008).
 27. *Cryogen-free low temperature and high magnetic field apparatus*, S. D. Kaushik, Anil K. Singh, D. Srikala, and S. Patnaik, **Ind. Jour. Pure and Appl. Phys** 46, 334 (2008).
 28. *Ferromagnetism and metal-semiconducting transition in Fe doped ZnO thin films* Abhinav Singh , Pardeep Thakur , K. Chae , W Choi , Basavaraj Angadi , S Kaushik , and S. Patnaik **J. Phys. D.** 41, 155002 (2008).
 29. *Magnetic field dependence of vortex activation energy: A comparison between MgB₂, NbSe₂, and Bi₂Sr₂Ca₂Cu₃O₁₀*, S. D. Kaushik and S. Patnaik, **Pramana, Journal of Physics** 71, 1335 (2008).
 30. *Control of exchange in cobalt nanoparticles by partial oxidation*, D. Srikala, V. Singh, A. Banerjee, B. R. Mehta and S. Patnaik **Jour. of Chem. Phys. C** 112, 36, 13882 (2008).
 31. *Synthesis and characterization of cobalt nanospheres, nanocubes and nanodiscs*, D. Srikala, V. Singh, A. Banerjee, and S. Patnaik **Jour. of Nanosci. and Nanotech.** 9, 5627 (2009).
 32. *Potassium fluoride doped LaOFeAs multi-band superconductor: Evidence of extremely high upper critical field*, S. J. Singh, J. Prakash, S. Patnaik and A. K. Ganguli, **Europhys. Lett.** 84, 57003 (2008).

33. *Superconductivity at 11.3 K induced by cobalt doping in CeOFeAs* S. J. Singh, J. Prakash, A. K. Ganguli, and S. Patnaik **Solid State Communication**, 149 189 (2009).
34. *Superconductivity at 42.7 K in CeO_{1-x}F_xFeAs with upper critical field of 94 T* J. Prakash, S. J. Singh, S. Patnaik and A. K. Ganguli, **Physica C**, 82, 469 (2009).
35. *Enhancement in superconducting transition temperature and upper critical field of LaO_{0.8}F_{0.2}FeAs with antimony doping*, S. J. Singh, J. Prakash, S. Patnaik, and A. K. Ganguli **Superconductor Science and Technology**, 22, 045017 (2009).
36. *Compositionally controlled semimetal to superconducting transition in NaF-doped LaOFeAs: Enhancement in T_c due to Na-doping*, Prakash J, Singh S J, S. Patnaik and Ganguli A K, **Physica C** 469, 300 (2009).
37. *Upper critical field, superconducting energy gaps, and Seebeck coefficient in La_{0.8}Th_{0.2}OFeAs*, Prakash J, Singh S J, S. Patnaik and Ganguli A K, **J. Phys. Cond. Mat.**, 21, 175705, (2009).
38. *Field dependent competing magnetic ordering in multiferroic Ni₃V₂O₈* A. K. Singh, D. Jain, V. Ganeshen, & S. Patnaik, **Europhys. Lett.** 86, 57001 (2009).
39. *Effect epitaxial strain on the magneto-electric coupling of YMnO₃ thin films* A. K. Singh, M. Snure, A. Tiwari, and S. Patnaik, **J. Appl. Phys.** 106, 014109 (2009).
40. *Enhancement in transition temperature and upper critical field of CeO_{0.8}F_{0.2}FeAs by yttrium doping*, J. Prakash, S. J. Singh, S. Patnaik and A. K. Ganguli, **Appl. Phys. Lett.** 95, 262507 (2009).
41. *Intragrain electric inhomogeneity and compositional variation of static dielectric constant in LaMn_{1-x}Fe_xO₃* A. Karmakar, S. Majumdar, A. K. Singh and S. Giri, **J. Phys. D: Appl. Phys.** 42, 092004 (2009).
42. *Superconductivity at 31.3 K in Yb-doped La(O/F)FeAs superconductors* J. Prakash, S. J. Singh, S. Patnaik and A. K. Ganguli, **J. Chem. Sci.** 122, 43(2010).
43. *New oxypnictide superconductor PrOFe_{1-x}Co_xAs* J. Prakash, S. J. Singh, S. Patnaik and A. K. Ganguli, **J. Solid State Chem.** 183, 338 (2010).
44. *Role of chemical pressure in enhancing the transition temperature (T_c) and upper critical field (H_{c2}) in the Y-doped Ce-oxyfluoride superconductor* A. K. Ganguli, J. Prakash, S. J. Singh and S. Patnaik, **Eur. Phys. J. B.** 73, 177 (2010).
45. *Yttrium doped La_{1-x}Y_xO_{0.9}F_{0.1}FeAs superconductors: Hall and Thermopower studies* S. J. Singh, J. Prakash, S. Patnaik and A. K. Ganguli, **Physica C** 470, 511 (2010).
46. *Anomalous Raman scattering from phonons and electrons of superconducting FeSe_{0.82}*, P.Kumar, U.Kumar, J. Prakash, A. K. Ganguli, S.Saha, S. Patnaik, U.V. Waghmare, A. K. Sood, **Solid State Communication** 150, 557 (2010).

47. *Coexistence of strong ferromagnetism and polar switching at room temperature in Fe₃O₄-BiFeO₃ nanocomposite thin films*, E. Weal, S. Patnaik, Z. Bi, H. Wang, T. Fix, A. Kursumovic and J. L. MacManus Driscoll, **Appl. Phys. Lett.** 97, 153121 (2010).
48. *Magnetoelectric coupling in Ca₃CoMnO₆*, S. D. Kaushik, S. Rayaprol, J. Saha, N. Mohapatra, V. Siruguri, P. D. Babu, S. Patnaik, and E. V. Sampathkumaran **J. Appl. Phys.** 108, 084106 (2010).
49. *Effects of simultaneous charge carrier doping in charge reservoir and conducting layers of superconducting CeO_{0.9}F_{0.1}Fe_{1-x}Co_xAs*, S. J. Singh, J. Prakash, S. Patnaik and A. K. Ganguli, **Physica C** 470 1928 (2010).
50. *Dominance of magnetoelastic coupling in hexagonal multiferroic YMnO₃*, A. K. Singh, S. D. Kaushik, V. Siruguri and S. Patnaik, **Phys. Rev. B** 81, 184406 (2010).
51. *Magnetoelectric behavior of ferrimagnetic Bi_xCo_{2-x}MnO₄ (x = 0, 0.1 and 0.3) thin films*, N.E. Rajeevan, Ravi Kumar, D.K. Shukla, R.J. Choudhary, P. Thakur, A.K. Singh, S.K. Arora, I.V. Shvets, P.P. Pradyumnan, S. Patnaik, **J. Mag. Mag. Mat.** 323, 1760 (2011).
52. *Magnetocapacitance in Ca₃CoMnO₆*, S. D. Kaushik, S. Rayaprol, J. Saha, N. Mohapatra, V. Siruguri, P. D. Babu, and S. Patnaik, **J. Appl. Phys.** 109 (2011).
53. *Strong room temperature magnetism in highly resistive strained thin films of BiFe_{0.5}Mn_{0.5}O₃*, E.-M. Choi, S. Patnaik, Q. X. Jia, H. Wang, E. Weal, S. L. Sahonta, Z. Bi, J. Xiong, M. G. Blamire, and J. L. Macmanus-Driscoll, **Appl. Phys. Lett.** 98, 012509 (2011).
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