Dr. Anil Kumar Singh

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Current Position: Assistant Professor (Since August 2011).

Education:

Visiting Fellow (Tata Institute of Fundamental Research, Mumbai, Dec 2010-July 2011).
Ph.D (Jawaharlal Nehru University, New Delhi, 2011).
M. Sc. (Banaras Hindu University, 2005)

Academic honors and awards:

- Best thesis award at 56th DAE Solid State Physics Symposium 2011 held at SRM University, Kattankulathur, Tamilnadu, India organized by Indian Physics Association (IPA).
- Senior Research Fellow (CSIR) (2009-2011).
- Junior Research Fellow (CSIR) (2007-2009).
- Life Member of Indian Association of Physics Teachers.
- Life member of Indian Science Congress Association.
- Life member of Neutron Scattering Society of India.
- Life member of Magnetics Society of India.

Date of Birth: 05th April, 1983.

Specialization: Experimental Condensed Matter Physics, Material Science, Low temperature Physics

Academic Interests

- Synthesis of different multiferroic materials using various techniques like solid state synthesis, sol-gel method, flux method; thin film growth by RF sputtering and pulsed laser deposition techniques.

- Study of magneto-electric coupling and its microscopic origin using neutron diffraction and X-ray diffraction.
- Investigation of novel multiferroic and magnetoelectric materials using transport, electrical, magnetic, thermodynamic and ferroelectric measurement techniques.
- Photovoltaic solar cell, sensors and memory based applications of multiferroic materials.

Research Publications

a) Journals

1) Structural, Dielectric and Magnetic Studies of Mn doped Y-Type Barium Hexaferrite ($Ba_2Mg_2Fe_{12}O_{22}$)
Md. F. Abdullah, P. Pal, S. R. Mohapatra, C. S. Yadav, S. D. Kaushik, A. K. Singh, *AIP Conf. Proc.* 1942, 130037 (2018).

2) Effect of Zr Doping on Structural, Dielectric and Magnetic Properties of Fe_2TeO_6
P. Pal, Md. F. Abdullah, S. R. Mohapatra, S. D. Kaushik, A. K. Singh, *AIP Conf. Proc.* 1942, 130039 (2018).

3) Enhanced antiferromagnetic transition and magnetodielectric study in Cobalt and Holmium co-substituted multiferroic $Bi_2Fe_4O_9$
SR Mohapatra, SD Kaushik, AK Singh, Materials Research Exp. 5 (1), 016107 (2018).

4) Effect of Holmium substitution on the magnetic and magnetodielectric properties of multiferroic $Bi_2Fe_4O_9$
S. R. Mohapatra, P. N. Vishwakarma, S. D. Kaushik, and **A. K. Singh**, J. Appl. Phys. 122, 134103 (2017).

5) Observation of self-polarization in the BSA protected Au20 clusters,
Deepak Swain, Alongbar Narzary, **Anil Singh**, Amreesh Chandra, T . Nagasawa, S. Yamamoto, Masaya Mitsuishi, S. Rath, , Nanotechnology 28, 445704 (2017)

6) Cobalt substitution induced magnetodielectric enhancement in multiferroic Bi2Fe4O9
S. R. Mohapatra, P. N. Vishwakarma, S. D. Kaushik, R. J. Choudhary, N. Mohapatra, and **A. K. Singh**, J. Appl. Phys. **121**, 124101 (2017).

7) Possible relaxation and conduction mechanism in W^{6+}doped $SrBi_4Ti_4O_{15}$ ceramic
P. Nayak, T. Badapanda, **A.K. Singh**, S. Panigrahi, Ceramics International **43**, 4527 (2017).

8) Unequivocal evidence of enhanced magnetodielectric coupling in Gd^{3+} substituted multiferroic $Bi_2Fe_4O_9$
S. R. Mohapatra, A. Swain, C. S. Yadav, S. D. Kaushik and **A. K. Singh**, *RSC Adv.* **6**, 112282 (2016).

9) Effect of cobalt substitution on structural, impedance, ferroelectric and magnetic properties of multiferroic $Bi_2Fe_4O_9$ ceramics
S. R. Mohapatra, B. Sahu, M. Chandrasekhar, P. Kumar, S. D. Kaushik, S. Rath, **A. K. Singh**, *Ceramics International* **42** 12352 (2016)

10) Optical, dielectric relaxation and conduction study of $Bi_2Fe_4O_9$ ceramic
S. R. Mohapatra, B. Sahu, T. Badapanda, M. S. Pattanaik, S. D. Kaushik, **A. K. Singh**, *J Mater Sci: Mater Electron* **27**, 3645 (2016).

11) Enhanced magnetodielectricity in Gd3+ substituted Bi2Fe4O9 ceramics
S. R. Mohapatra, C. S. Yadav, S. D. Kaushik, and **A. K. Singh**, *AIP Conf. Proc.* **1832**, 140019 (2017)

12) **Structural, dielectric and magnetic studies of Fe_2TeO_6 and $Fe_2Te_{0.96}Nb_{0.04}O_6$ ceramics**
P. Pal, S. R. Mohapatra, S. D. Kaushik, and **A. K. Singh**, *AIP Conf. Proc.* **1832**, 140026 (2017).

13) Evidence of Magnetoelectric coupling in Bi2(1-x)Ho2xFe4O9 (x = 0, 0.01) multiferroic ceramics
S. R. Mohapatra, C. S. Yadav, S. D. Kaushik, and A. K. Singh, *AIP Conf. Proc.* 1832, 140019 (2017).

14) Enhanced Dielectric, Impedance and Magnetic characteristics of Co doped multiferroic $Bi_2Fe_4O_9$
S. R. Mohapatra, B. Sahu, S. D. Kaushik, **A. K. Singh**, *AIP Conf. Proc.* **1731**, 110035 (2016).

15) Studying dielectric mechanism and magnetization of double perovskite Gd_2NiMnO_6 Ceramic
S. R. Mohapatra, B. Sahu, S. D. Kaushik, **A. K. Singh,** *AIP Conf. Proc.* **1731**, 130043 (2016).

16) Structural, Optical, Dielectric and Magnetic Investigation on Mixed Valance $Pb_3Mn_7O_{15}$
B. Sahu, S. R. Mohapatra, M. S. Pattanaik, S. Raut, S. D. Kaushik, **A. K. Singh,** *AIP Conf. Proc.* **1731**, 140053 (2016).

17) Structural, dielectric and magnetic studies of magnetoelectric trirutile Fe2TeO6
S. D. Kaushik, B. Sahu, S. R. Mohapatra, and **A. K. Singh**, *AIP Conf. Proc.* **1731**, 130037 (2016).

18) Dielectric response of double layered perovskite Sr3MnTiO7
S. Chowki1, B. Sahu, **A. K. Singh**, and N. Mohapatra, *AIP Conf. Proc.* **1731**, 090040 (2016).

19) Effect of Co doping on structural, optical, magnetic and dielectric properties of $Bi_2Fe_4O_9$
S. R. Mohapatra, B. Sahu, S. D. Kaushik, **A. K. Singh**, *AIP Conf. Proc.* **1665**, 140034 (2015).

20) Investigation on structural, optical and magnetic properties of double perovskite Gd_2NiMnO_6
S. R. Mohapatra, B. Sahu, S. D. Kaushik and **A. K. Singh**, *AIP Conf. Proc.* **1665**, 140032 (2015).

21) Structural, Dielectric and Magnetic Studies on $BiPbSr_2MnO_6$
B. Sahu, S. R. Mohapatra, S. D. Kaushik, V. Siruguri, **A. K. Singh**, *AIP Conf. Proc.* **1665**, 140043 (2015).

22) Structural, optical and dielectric property of Co doped Bi2Fe4O9
Smita Swain, S. R. Mohapatra, B. Sahoo, and **A. K. Singh**, *AIP Conf. Proc.* **1591**, 1744 (2014).

23) Robust nature of frustrated antiferromagnetism in $ACrO_2$(A = Pd/Li) compounds
A. K. Singh, Tathamay Basu, Kartik K. Iyer, K. Mukherjee, P. L. Paulose, and Echur V. Sampathkumaran, *AIP Conf. Proc.* **1536**, 1039 (2013).

24) Magnetodielectric properties of frustrated antiferromagnet $LiCrO_2$
A.K. Singh, K. Singh, Tathamay Basu, K. K. Iyer, P. L. Paulose, and E. V. Sampathkumaran, *AIP Conference Proceedings* **1512**, 1274 (2013).

25) Magnetic study under external high pressure and magnetic field in low dimensional honeycomb lattice $In_3Cu_2VO_9$
Kartik K. Iyer, Tathamay Basu, **A. K. Singh**, K. Mukherjee, P. L. Paulose, and Echur V. Sampathkumaran, *AIP Conf. Proc.* **1536**, 1049 (2013).

26) Magnetic, magnetoresistance, and magnetodielectric properties of oxygen deficient charge ordered manganite, $Pr_{0.5}Ca_{0.5}MnO_{3-\delta}$,
A. Karmakar, S. Majumdar, **A.K. Singh**, S. Patnaik, S. Giri, J. Magn. Magn. Mater. 324, 649 (2012).

27) Doping effects towards tuning magneto-elasticity in YMnO3.
A. K. Singh, S. D. Kaushik, V. Siriguri, and S. Patnaik, *AIP Conf. Proc.* 1349, 1023 (2011).

28) Effect of Dy doping in frustrated multiferroic h -YMnO3,
A. K. Singh, S. D. Kaushik, V. Siruguri, and S. Patnaik, *AIP Conf. Proc.* 1349, 1283 (2011).

29) Spin Frustrated Magnets:A novel Route to Multiferroicity.
A. K. Singh and S. Patnaik, *AIP Conf. Proc.* 1349, 29 (2011).

30) An all-organic steroid–D–π-A modular design drives ferroelectricity in supramolecular solids and nano-architectures at RT
Deepak Asthana, **Anil Kumar**, Abhishek Pathak, Pradip Kumar Sukul, Sudip Malik, Ratnamala Chatterjee, Satyabrata Patnaik, Kari Rissanen, Pritam Mukhopadhyay, *Chemical Communications* 47, 8928 (2011).

31) Dominance of magnetoelastic coupling in multiferroic hexagonal $YMnO_3$
A. K. Singh, S. D. Kaushik, V. Siriguri, and S. Patnaik, *Phys. Rev. B* 81, 184406 (2010).

32) Field dependent competing magnetic ordering in multiferroic $Ni_3V_2O_8$
A. K. Singh, D. Jain, V. Ganeshen, & S. Patnaik, *Euro. Phys. Lett.* 86, 57001 (2009).

33) Effect of epitaxial strain on the magneto-electric coupling of $YMnO_3$ thin films
A. K. Singh, M. Snure, A. Tiwari, and S. Patnaik, *J. Appl. Phys.* 106, 014109 (2009).

34) Intragrain electric inhomogenitis and compositional variation of static dielectric constant in $LaMn_{1-x}Fe_xO_3$
A. Karmakar, S. Majumdar, **A. K. Singh** and S. Giri, *J. Phys. D: Appl. Phys.* 42, 092004 (2009).

35) Substantial magnetoelectric coupling near room temperature in $Bi_2Fe_4O_9$
A. K. Singh, S. D. Kaushik, Brijesh Kumar, P. K. Mishra, A. Venimadhav, V. Siruguri and S. Patnaik, *Appl. Phys. Lett*. 92, 132910 (2008).

36) Magnetoelectric properties of $Bi_xCo_{2-x}MnO_4$
N. E. Rajeevan, P. P. Pradyumnan, Ravi Kumar, D. K. Shukla, S. Kumar, **A. K. Singh**, S. Patnaik, S. K. Arora, and I. V. Shvets, *Appl. Phys. Lett*. 92, 102910 (2008).

37) Cryogen –free low temperature and high magnetic field apparatus
S. D. Kaushik, **A. K. Singh**, D. Srikala & S. Patnaik, *Indian J. of Pure & Appl. Phys*. 46, 334(2008).

38) http://www.natureasia.com/asia-materials/highlight.php?id=244

b) In Conferences/ Symposia

1. **Effect of Co doping on structural, optical, magnetic and dielectric properties of $Bi_2Fe_4O_9$**
S. R. Mohapatra, B. Sahu, S. D. Kaushik and A. K. Singh
Presented at DAE SSPS 2014 held at VIT, Vellore during 16th - 20th December 2014.

2. **Crystal and magnetic structure of $BiPbSr_2MnO_6$**
B. Sahu, S. R. Mohapatra, S. D. Kaushik, V. Siruguri, A. K. Singh
Presented at DAE SSPS 2014 held at VIT, Vellore during 16th - 20th December 2014.

3. **Investigation On Structural, Optical And Magnetic Properties Of Double Perovskite Gd_2NiMnO_6**
S. R. Mohapatra, B. Sahu, S. Raut, S. D. Kaushik, A. K. Singh
Presented at DAE SSPS 2014 held at VIT, Vellore during 16th - 20th December 2014.

4. **Role of pentagon spin frustration in magnetoelectric $Bi_2Fe_{4-x}Co_xO_9$ ($0 \leq x \leq 0.8$)**
S. R. Mohapatra , B. Sahu, A. K. Singh
Presented at International Conference on Strongly Correlated Electron Systems (SCES 2014) held at Grenoble, France during 7-11 July 2014.

5. **Temperature dependant dielectric and magnetic study of double perovskite Gd_2NiMnO_6**

S. R. Mohapatra, B. Sahu, S. Raut, S. D. Kaushik, A. K. Singh
Presented at conference on CTCMP held at NISER BBSR during 19 th -22 nd Feb 2015.

6. **Ambiguity in crystal structure of possible magnetoelectric $BiPbSr_2MnO_6$**
B. Sahu, S. R. Mohapatra, S. D. Kaushik, V. Siruguri, A. K. Singh
Presented at MRS Spring Meeting & Exhibit, held at San Francisco, California during 2013-2014.

7. **Ambiguity in crystal structure of possible magnetoelectric $BiPbSr_2MnO_6$**
B. Sahu, S. R. Mohapatra, S. D. Kaushik, V. Siruguri, A. K. Singh
Presented at Conference on Neutron Scattering, IISER Pune during 10^{th} –12^{th} February 2014.

8. **Crystal and magnetic structure of $BiPbSr_2MnO_6$**
B. Sahu, S. R. Mohapatra, S. D. Kaushik, V. Siruguri, A. K. Singh
Presented at International Conference on Strongly Correlated Electron Systems held at Grenoble, France during 7-11 July 2014.

9. Dielectric anomaly in lattice mismatched $YMnO_3$.
Anil Kumar Singh, Ashutosh Tiwari and S. Patnaik
Proceeding of 52^{nd} DAE Solid State Physics Symposium, page 1159 vol 52, (2007).

10. Structure and dielectric property of Cr doped $YMnO_3$.
Anil Kumar Singh and S. Patnaik
4^{th} SERC School on Condensed Matter and Material Physics, Organized by School of Physics University of Hyderabad, India, November 13 – December 9, 2006.

11. Structure and dielectric property of Cr doped $YMnO_3$.
Anil Kumar Singh and S. Patnaik
Workshop on Condensed Matter Research: Magnetic Materials Organized by Indian National Science Academy & Hungarian Academy of Sciences, Organized by School of Physics University of Hyderabad, India, December 4, 2006.

12. Multiferroicity in $Bi_2Fe_4O_9$ near room temperature
Anil Kumar Singh and S. Patnaik
Proceeding of 53^{rd} DAE Solid State Physics Symposium, page 973 vol 53, (2008).

13. Multiferroicity in spin frustrated $Bi_2Fe_4O_9$ and $Ni_3V_2O_8$.
Anil Kumar Singh and S. Patnaik
Presented at ICMS-ICMR winter School on New Carbon based materials and functional Oxides held at JNCASR, Banglaore, India, Dec 08-13, 2008.

14. Origin of multiferroicity in hexagonal $Y_{1-x}Dy_xMnO_3$.
A. K. Singh, S. D. Kaushik, V. Siriguri, and S. Patnaik
Presented at American Physical Society (APS) March Meeting at Pittsburgh, USA, March 16-20, 2009.

15. Microscopic origin of multiferroicity in hexagonal $YMnO_3$ via in field neutron diffraction and dielectric measurements.
A. K. Singh, S. D. Kaushik, V. Siriguri, and S. Patnaik
Presented at Conference on neutron scattering and mesoscopic systems held at International Center/ Goa University, India, Oct 12-14, 2009.

16. Modification in magnetoelectric coupling in Dy doped $YMnO_3$.
S. D. Kaushik, **A. K. Singh**, V. Siriguri and S. Patnaik

Presented at Conference on neutron scattering and mesoscopic systems held at International Center/ Goa University, India, Oct 12-14, 2009.

17. Observation of magneto-electric coupling in hexagonal $YMnO_3$ via infield neutron diffraction experiment.
A. K. Singh, S. D. Kaushik, V. Siriguri and S. Patnaik
Presented at Material Research Society (MRS) fall meeting at Boston, USA, 30 Nov – 4 Dec 2009.

18. Effect of epitaxial strain on the magnetoelectric coupling of lattice mismatched $YMnO_3$ thin films grown on Sapphire (0001) substrate with conducting $Zn_{0.99}Ga_{0.01}O$ bottom contact.
Anil K. Singh, Michael Snure, Ashutosh Tiwari and S. Patnaik
Presented at Material Research Society (MRS) fall meeting at Boston, USA, 30 Nov – 4 Dec 2009.

c) Oral Presentations:

1. Structure and dielectric property of multiferroic $YMnO_3$.
Anil Kumar Singh and S. Patnaik
Proceeding of 51th DAE Solid State Physics Symposium, page 973 vol 51 (2006).

2. Dielectric anomaly in lattice mismatched $YMnO_3$ thin film.
Anil Kumar Singh and S. Patnaik
Presented at Conference on Mesogenic and Ferroic Materials (CMFM 09) held at Department of Physics, Banaras Hindu University, Varanasi (2009).

3. On the origin of magneto-electric coupling in hexagonal $YMnO_3$,
A. K. Singh, S. D. Kaushik, V. Siriguri and S. Patnaik
Proceeding of 54th DAE Solid State Physics Symposium, page 1153 vol 54 (2009).

4. Study of magnetoelectric coupling in geometrically frustrated multiferroics.
A. K. Singh. Presented in a seminar at University of Utah, Material Science and Engineering Department, Salt lake City, Utah 84112 USA on 20 Jan 2010.

5. **Ambiguity in crystal structure of possible magnetoelectric $BiPbSr_2MnO_6$**
B. Sahu, S. R. Mohapatra, S. D. Kaushik, V. Siruguri, A. K. Singh
Presented at MRS Spring Meeting & Exhibit, held at San Francisco, California during 2013-2014.

6. **Ambiguity in crystal structure of possible magnetoelectric $BiPbSr_2MnO_6$**
B. Sahu, S. R. Mohapatra, S. D. Kaushik, V. Siruguri, A. K. Singh
Presented at Conference on Neutron Scattering, IISER Pune during 10th –12th February 2014.

7. **Crystal and magnetic structure of $BiPbSr_2MnO_6$**
B. Sahu, S. R. Mohapatra, S. D. Kaushik, V. Siruguri, A. K. Singh
Presented at International Conference on Strongly Correlated Electron Systems held at Grenoble, France during 7-11 July 2014