# Bio-data

1. **Name**: Amal Kumar Das

2. **Personal Data**:

Nationality: Indian
Date of birth: 11.06.1969
Sex: male
Marital status: married

3. **Address for Correspondence:**

Associate Professor
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4. **Academic Qualifications**:

[6] 2002 Ph. D, Physics (awarded in July)
Institute of Physics (Utkal University), Bhubaneswar, India.

[5] 1995 Post M. Sc Course in Advanced Physics
Institute of Physics, Bhubaneswar, India.
(Equivalent to M. Phil., Utkal University)

[4] 1994 M. Sc., Physics **(First Class)**
University of Calcutta, Kolkata, India.

[3] 1991 B. Sc., Physics **(First Class)**
University of Calcutta, Kolkata, India.

[2] 1987 Higher Secondary (H. S) **(First Div.)**
Vidyasagar College, Kolkata, India.

[1] 1985 School Final (M. P) **(First Div.)**
Banshihari High School, Dakshin Dinajpur, West Bengal, India.

5. **Employment History (Research and Teaching Experiene)**:

[6] 8 years (2011 - present) – Associate Professor, Department of Physics, IIT Kharagpur, India.

[5] 1 year (2013) – Guest Scientist, Johannes Kepler University (JKU), Linz, Austria.

[4] 6 years (2005 – 2011) - Assistant Professor, Department of Physics, IIT Kharagpur, India.

[3] 2 months (2006) –Guest Scientist, Max-Planck Institute, Halle, Germany.

[2] 1 year (2004 – 2005) - Visiting Faculty, Department of Physics, IIT Kharagpur, India.

[1] 2 years (2002 – 2004) - Guest Scientist, Paul-Drude Institute (PDI), Berlin, Germany.

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6. **Award:** "Young Physicists Award" received from 'The Indian Physical Society' in 2000.

7. **Field of Specialization :** Experimental Condensed Matter Physics/Material Science; Magnetism and spintronics;

8. **Teaching Experiences:**

**At the undergraduate level**: (B. Tech, 5 year integrated M. Sc & 2 year M. Sc students)

PHYSICS I: Oscillation, Wave & Quantum Physics
(1st year B. Tech students); **No. of students in class: 150 -200**

PHYSICS II: Quantum Mechanics & Solid State Physics
(2nd yr B. Tech students); **No. of students in class: 200 - 225**

Atomic and Melecular Spectroscopy
(Integrated 5 years M. Sc and post-B. Sc 2 years M. Sc students) **No. of students in class: 70 - 80**

**At the postgraduate level**: (M. Tech & Ph. D students)

Physics of Semiconductor Devices; Solid State Devices; Physics of Materials; Analytic Techniques; Thin Film Technology; Spintronic and magnetoelectronic materials and devices;
**No. of students in class: 20 – 30.**

**The subjects were taught during the period of 2004 to present and each subject was taught multiple times.**

**The online feedback of students are taken by the Institute in the scale of 1 – 5 (1 = poor, 2 = average, 3 = good, 4 = very good, 5 = excellent). I am recognized as a good teacher with score of 3.56 (average of last ten years).**

**NPTEL VIDEO COURSE (Initiative of MHRD, Government of India):**
(NPTEL: National Programme for Technology Enhanced Learning)

**Solid State Physics** in 2017, 2018, 2019; No. of Students registered: 2000 – 2500
**Atomic and Molecular** Physics in 2018; No. of Students registered: 1800
**Experimental Physics** in 2018, 2019; No. of Students registered: 2500 – 3000

**Based on the students' feedback, solid state physics and experimental physics are selected to continue the rerun in alternative semester till 2021.**

9. **Publications:**

**I. Publication in refereed Journals:** Total number: 83 (Eighty five)
(The list of all publications with details is given in separate section)

| Name of Journals | Impact Factor | Number of publications |
|---|---|---|
| I. Physical Review Letters | 9.227 | FIVE |
| II Applied Surface Science | 5.155 | TWO |
| III. Journal of Physical Chemistry C | 4.484 | ONE |
| IV. Physical Review B | 3.836 | SEVEN |
| V. Journal of Alloys and Compounds | 3.779 | TWO |
| VI. Applied Physics Letters | 3.521 | TEN |
| VII. Nanotechnology | 3.399 | TWO |
| VIII. Journal of Magnetism and Magnetic Materials | 3.046 | SEVEN |
| IX. Journal of Physics D: Applied Physics | 2.829 | ONE |
| X. Journal of Physics: Condensed Matter | 2.711 | TWO |
| XI. Journal of Applied Physics | 2.328 | EIGHT |
| XII. EuroPhysics Letters | 1.957 | ONE |
| XIII. Physica B: Condensed Matter | 1.874 | FIVE |
| XIV. Review of Scientific Instruments | 1.587 | TWO |
| XV. Other Journals | IF < 1.6 | The Rest |

**As per google scholar on 25/07/2019, the overall citation and h-index of 79 publications is copied and pasted below. (* 4 papers are in print)**

| **Publications:** | **All** | **Since 2014** |
|---|---|---|
| **Citations** | **1740** | **823** |
| **h-index** | **22** | **13** |
| **i10-index** | **30** | **15** |

**The TEN recent publications are given below:**

[1] Size-dependent structural and magnetic properties of disordered Co2FeAl Heusler alloy nanoparticles, Aquil Ahmad, Srimanta Mitra, Sanjeev Kumar Srivastava and **Amal Kumar Das, Journal of Magnetism and Magnetic Materials 474, (2019) 599.**

**Impact facor: 3.046**

[2] Effect of L21 and XA ordering on phase stability, half-metallicity and magnetism of Co2FeAl Heusler Alloy: GGA and GGA+U approach, Aquil Ahmed, Sanjeev Kumar Srivastava and **Amal Kumar Das, Journal of Magnetism and Magnetic Materials**, Accepted on 23rd July, 2019 (in press)

**Impact facor: 3.046**

[3] Enhancement and sign inversion of junction magnetoresistance on Mn substitution in magnetite/p-Siheterostructures, Harinath Aireddy and **Amal Kumar Das, Journal of Physics D: Applied Physics 49, (2016) 415003.**

**Impact Factor : 2.829**

[4] Electric field dependence of junction magnetoresistance in magnetite/semiconductor heterostructure at room temperature, Harinath Aireddy, Sudipta Bhaumik and **Amal Kumar Das, Applied Physics Letter 107, (2015) 232406.**

**Impact Factor : 3.521**

[5] Radio Frequency Scanning Tunneling Spectroscopy for Single-Molecule Spin Resonance, Stefan Müllegger, Stefano Tebi, **Amal Kumar Das**, Wolfgang Schöfberger, Felix Faschinger, and Reinhold Koch, **Physical Review Letter 113, (2014) 133001.**

**Impact Factor : 9.227**

[6] Radio-frequency excitation of single molecules by scanning tunneling microscopy, Stefan Müllegger, **Amal K Das, Karlheinz Mayr and Reinhold Koch, Nanotechnology 25, (2014) 135705.**

**Impact Factor : 3.399**

[7] Giant junction magnetoresistance effect in ferromagnet/semiconductor heterostructures, Anirban Sarkar, Rajdeep Adhikari, and **Amal Kumar Das**, **Journal of Applied Physics 114, (2013) 154513.**

**Impact Factor : 2.328**

[8] Magnetic Schottky diode exploiting spin polarized transport in Co/p-Si heterostructure, A. Sarkar, R. Adhikari and **A. K. Das, Applied Physics Letter 100, (2012) 262402.**

**Impact Factor : 3.521**

[9] Variation and sign change of magnetostrictive strain as a function of Ni concentration in Ni-substituted $ZnFe_2O_4$ sintered nanoparticles, Rajdeep Adhikari, Anirban Sarkar, Mukta V. Limaye, S. K. Kulkarni and **Amal Kumar Das, Journal of Applied Physics 111, (2012) 073903.**

**Impact Factor : 2.328**

[10] A versatile cantilever beam magnetometer for *ex situ* characterization of magnetic materials, Rajdeep Adhikari, Anirban Sarkar, and **Amal Kumar Das, Review of Scientific Instruments 83, (2012) 013930.**

**Impact Factor : 1.587**

**II. Publications in proceedings of Seminars/Conferences**

| | |
|---|---|
| **[International]** | **10** |
| **[National]** | **51** |

10. **Patents:** 1 **-** Deutsche Patentanmeldung Nr. 103 11 717.2, March 17, (2003).

11. **Research Guidance**: Ph. D Thesis: **Completed : SEVEN** (single guidance-03 and joint guidance-04);
**On-going : SEVEN** (single guidance-04 and joint guidance-03).

M. Tech/M. Sc Thesis: **Completed : TWENTY FIVE** (single guidance-25 and joint guidance-00);
**On-going : THREE** (single guidance-03 and joint guidance-00).

## List of the Ph. D students under my guidance

| Sl No. | Name of students | Title of thesis | Remarks |
|---|---|---|---|
| *1 | Sandip Majumdar | GROWTH AND CHARACTERISTICS OF MANGANESE DOPEDGERMANIUM AND COBALTCOPPER GRANULAR ALLOY FORSPINTRONIC DEVICES | Completed in 2009 |
| 2. | Rajdeep Adhikari | DEVELOPMENT OF OPTICAL CANTILEVER BEAM MAGNETOMETER ANDSTUDIES ON OXIDE MAGNETIC MATERI:ALS FOR SPINTRONICAPPLICATIONS | Completed in 2011 |
| 3 | Anirban Sarkar | DEVELOPMENT OF CANTILEVER BEAM MAGNETOMETER FOR IN SITU CHARACTERIZATIONS AND STUDIES ON HETEROSTRUCTURE BASED MAGNETIC DIODE | Completed in 2013 |
| *4 | K. Devi Chandrasekhar | EXPLORING THE CORRELATION OF STRUCTURAL, MAGNETIC AND MAGNETODIELECTRIC PROPERTIES IN $R_2MnNiO_6$ and $R_{(1-x)}Ca_xMnO_3$ (R = RARE EARTH) PEROVSKITE SYSTEM | Completed in 2013 |
| *5 | Sudipta Bhaumik | TIN OXIDE (SnO2) BASED DILUTE MAGNETIC SEMICONDUCTORS FOR SPINTRONIC APPLICATIONS | Completed in 2015 |
| 6 | Harinath Aireddy | DEVELOPMENT OF CANTILEVER BEAM MAGNETOMETER FOR ELECTRIC FIELD INDUCED MAGNETIC MEASUREMENTS AND STUDIES ON MAGNETIC AND PIEZOELECTRIC MATERIALS FOR SPINTRONIC APPLICATIONS | Completed in 2017 |
| *7 | C. Dhanasekhar | MULTIFERROIC STUDIES ON GEOMETRICALLY FRUSTRATED COLALTITE BASED SWEDENBORGITE SYSTEMS | Completed in 2018 |
| *8 | Aquil Ahmed | Nanoparticles of Co-based Heusler alloys | To be submitted by 2019 |
| *9 | Arijit Sarkar | Studies on Si Nanostructures and Flexible Si Membranes for Optoelectronic Devices | Submitted |
| 10 | ArchanaKumari | Oxide materials for spintronic applications | To be submitted by 2019 |
| 11 | Niladri Sekhar | Topological Insulator for spintronic applications | On-going |
| 12 | Sajib Biswas | Ferromagnet/semiconductor heterostructures for spintronic applications using in-situ cantilever beam magnetometer | On-going |
| 13 | Suman Guchhait | Ferromagnetic/ferroelectric heterostructures for spintronic applications using optical cantilever beam magnetometer | On-going |
| *14 | Soumen Chowdhuri | Magnetism and superconductivity of Co thin films | On-going |

***indicates joint guidance**

12. **R&D Sponsored Projects: ONLY as a PRINCIPAL INVESTIGATOR (PI)**

**i) DST :** Magneto-transport studies on ferromagnet/semiconductor heterojunctions for spintronic applications. Principal Investigator (PI) : Dr. Amal K. Das ; Co-PI : Prof. D. K. Goswami. Budget : 48 lakhs. Time period : 2015 to 2018 (completed).

**ii) CSIR :** Study of magnetoelectric properties of ferromagnetic/ferroelectric heterostructures using cantilever beam technique. Principal Investigator (PI) : Dr. Amal K. Das, Co-PI : Prof. S. K. Ray. Budget : 19.68 lakhs. Time period : 2015 to 2019 (completed).

**iii) CSIR :** *Study of magnetic properties of thin films on semiconductor substrates using "cantilever beam magnetometer".* **Principal Investigator (PI) : Dr. Amal K. Das**, Co-PI : Prof. S. K. Ray. **Budget : 15.12 lakhs**. **Time period : 2005 to 2009** (completed).

**iv) ISIRD :** *Study of magnetic properties of thin films on semiconductor substrates using "cantilever beam magnetometer".* **Principal Investigator (PI) : Dr. Amal K. Das**, **Budget : 03 lakhs**. **Time period : 2006 to 2009** (completed). [This project is tied up with the CSIR project].

**v) DRDO *:*** Development of cantilever beam magnetometer for in-situ measurement of mechanical and magnetic properties of thin films for spintronic application. **Principal Investigator (PI) : Dr. Amal K. Das** ; Co-PI : Prof. S. K. Ray. **Budget : 69.92 lakhs. Time period : 2006 to 2009** (Completed)

**vi) BRNS :** Co-ordinated Research Project (CRP)-Spintronics materials - Simulation and Design of Spintronics Materials. **This is a multi-Institute project on Spintronics among the following Institutes** : IIT Kharagpur, IACS Kolkata, TIFR Bombay, Pune University, NCL Pune, IIT Kanpur.
**Investigator from IIT Kharagpur**: **Dr. Amal K. Das ;** Grant sanctioned to IIT Kharagpur Rs. 27.94 lakhs ; Time period : 2006 to 2009 (Completed).

13. **Research Activity:**

**I with my students have developed a unique compact instrument for characterizing the mechanical, magnetic and dielectric properties of materials. The brief highlights are given below:**

1. I with my students have developed a research and teaching instrument at IIT Kharagpur first of its kind in India and among very few in the world called "Cantilever Beam Magnetometer (CBM)". The CBM was used for in-situ characterization of mechanical and magnetic properties of thin films. I have made it versatile to measure the magnetic properties of bulk, ribbon, nanoparticles and thin film of magnetic materials in air and also generalised the theory of bending moment for analysing the experimental data. As a new contribution in CBM, the work is published in specialised journal "Review of Scientific Instruments" where one can publish the new or upgraded Instruments.

**[Ref.]** A versatile cantilever beam magnetometer for ex situ characterization of magnetic materials, R. Adhikari, A. Sarkar, and **A. K. Das, Review of Scientific Instruments 83, (2012) 013930.**

2. I with my students have developed a simpler version of CBM for teaching laboratory in the IIT Kharagpur and published in a specialised journal "American Journal of Physics" known as "Physics Teacher" where one can publish research matter bringing in a level of college students.

**[Ref.]** The cantilever beam magnetometer: A simple teaching tool for magnetic characterization, Rajdeep Adhikari, Rakesh Kaundal, Anirban Sarkar, Pushpinder Rana, and **Amal K. Das, American Journal of Physics 80 (3),(2012) 225.**

3. Recently the CBM is developed for the first time in the measurement of electric stress (electrostriction and piezoelectricity) including the magnetic stress to study the ferromagnet/ferroelectrics heterostructures for the electric field controlled spintronic devices. This development is again accepted in Review of Scientific Instruments for publication.

**[Ref.]** The cantilever beam magnetometer for the measurement of electric field controlled magnetic property of ferromagnet/ferroelectrics heterostructures, Harinath Aireddy and **Amal Kumar Das, Review of Scientific Instruments, 2019 (accepted for publication).**

**I with my students have demonstrated prototype devices for application in spintronics. The brief highlights are given below:**

4. The group of mine is working on the electro-magnetic transport properties of ferromagnet/semiconductor heterostructures continuously and steadily to resolve some fundamental issues and demonstrated that the heterostructures can be used as a magnetic diode device in spintronics. The works are published in Applied Physics Letters (APL).

**[Ref.] APL 94 (2009) 122505; 98 (2011) 183504; 100 (2012) 262402; 107 (2015) 232406.**

5. I was working in a German group and demonstrated the magnetologic gate functionality of ferromagnet/semiconductor heterostructure. The work was published in Physical Review letter. The group (excluding me) generalized the idea and proposed that the GMR element can be used as programmable magnetologic gates and published in NATURE.

**[Ref.]** Ferromagnetism of MnAs studied by heteroepitaxial films on GaAs(001), **A. K. Das,** C. Pampuch, A. Ney, T. Hesjedal, L. Daeweritz, R. Koch, and K. H. Ploog, **Phys. Rev. Lett. 91, (2003) 087203.**

**[Ref.]** Magnetologic with α-MnAs/GaAs(001), C. Pampuch, **A. K. Das,** A. Ney, L. Daeweritz, R.Koch, and K. H. Ploog, **Phys. Rev. Lett. 91, (2003) 147203.**

**[Patent]** "Magnetische Logikeinrichtung und Verfahren zu deren Betrieb" (Magnetic logic mechanism and procedure for their applications), C. Pampuch, **A. K. Das**, A. Ney and R. Koch, Deutsche Patent anmeldung Nr. 103 11 717.2, March 17, (2003).

**[Ref.]** Programmable computing with a single magnetoresistive element, A Ney, C Pampuch, R Koch, KH Ploog, **Nature 425 (2003) 485.**

14. **Departmental/Institute Level Activity:**

(a) I have developed a mini-version of cantilever beam magnetometer (CBM) for teaching laboratory of M. Tech in solid state technology at Department of Physics.
(b) I have set up TWO experiments to (i) determine the "Avodagro Number" using silver Voltameter and (ii) study the vibrational spectra of iodine molecules for teaching laboratory of 3$^{rd}$ year in atomic and molecular spectroscopy.
(c) I was responsible for looking after the departmental research facility and DST-FIST project since 2011 for eight years **(FIST Laboratory-in-Charge).**

(d) I am responsible for looking after the Institute central research facility (CRF) laboratory of vibrating sample magnetometer (VSM) since 2016 to the present day **(CRF-VSM Laboratory-in-Charge).**

(e) I was responsible for looking after the overall maintenance works of the Department of Physics since 2008 for ten years (**Maintenance-in-Charge).**

(f) I was responsible for looking after the teaching laboratory of 3rd year (Optics, electromagnetism and modern physics) since 2006 to 2011 **(3rd year Teaching Laboratory-in-Charge).**

(g) I was responsible to conduct UG & PG Examinations in the Department since 2006 to 2008 **(Examination-in-Charge).**

(h) I was Faculty Advisor of 5yr integrated M. Sc students since 2009 for 5 years till 2014 and of 2yr M. Sc students since 2012 for 2 years till 2014 **(Faculty Advisor).**

(i) I am appointed warden of a students' hostel for the welfare of the student community since July, 2019.

**15. List of Publications:**

- **Publications in refereed journals:**

**(a) International : 81 and (b) National : 02 (marked with **)**

[83] Size-dependent structural and magnetic properties of disordered Co2FeAl Heusler alloy nanoparticles, Aquil Ahmad, Srimanta Mitra, Sanjeev Kumar Srivastava and **Amal Kumar Das, Journal of Magnetism and Magnetic Materials 474, (2019) 599.**

[82] Effect of L21 and XA ordering on phase stability, half-metallicity and magnetism of Co2FeAl Heusler Alloy: GGA and GGA+U approach, Aquil Ahmed, Sanjeev Kumar Srivastava and **Amal Kumar Das, Journal of Magnetism and Magnetic Materials 491 (2019) 165635.**

[81] The cantilever beam magnetometer for the measurement of electric field controlled magnetic property of ferromagnet/ferroelectrics heterostructures, Harinath Aireddy and **Amal Kumar Das, Review of Scientific Instruments, 2019 (accepted for publication).**

[80] Electron doping induced magnetic glassy state in phase separated YBaCo2O5.5-δ
A Kumari, C Dhanasekhar, and **A K Das, Journal of Magnetism and magnetic 491 (2019) 165620.**

[79] Spin state transitions associated with magnetic phase separation in EuBaCo2O5+ δ (δ= 0.47) cobaltite
A Kumari, C Dhanasekhar, A K Das, Journal of Alloys and Compounds 802 (2019) 409-414

[78] Anomalous freezing of dielectric polarons near magnetic ordering in multiferroic La0. 5Bi0. 5FeO3,
S Mallesh, J Krishnamurthy, **A K Das,** A Venimadhav, and D C Kakarla, **Ceramics International 45 (2019) 6250-6254.**

[77] Spin-dependent giant junction magnetoresistance in simple Fe/p-Si (001) Schottky heretrojunction at low temperature, A Sarkar, R Adhikari, A K Das, Applied Physics A 125 (2019), 60

[76] Geometry Controlled White Light Emission and Extraction in CdS/Black-Si Conical Heterojunctions, A Sarkar, A K Katiyar, S Mukherjee, S Singh, S K Singh, **A K Das,** SK Ray, **ACS Applied Electronic Materials 1 (2018) 25-33.**

[75] Si membrane–ZnO heterojunction-based broad band visible light emitting diode for flexible optoelectronic devices, Arijit Sarkar, Ajit K Katiyar, **Amal K. Das** and Samit K. Ray, **Flex. Print. Electron. 3, (2018) 025004.**

[74] Effect of Sr doping on structural and magnetic behavior of $SmBa_{1-x}Sr_xCo_2O_{5+\delta}$ (x = 0 and 1), Archana Kumari, C. Dhanasekhar, and **A. K. Das, Physica B : Condensed Matter 536, (2018) 267-271.**

[73] Switching from pyroelectric to ferroelectric order in Ni doped $CaBaCo_4O_7$, C. Dhanasekhar, **A. K. Das,** Ripandeep Singh, A. Das, G. Giovannetti, D. Khomskii, A.Venimadhav, **Phys. Rev. B 96, (2017) 134413.**

[72] Coexistence of weak ferromagnetism with magnetoelectric coupling in Fe substituted $Co4Nb_2O_9$, C. Dhanasekhar **,** S. K. Mishra , R. Rawat , **A. K. Das** and A. Venimadhav, **J. Alloys Compd. 726, (2017) 148-153.**

[71] Enhancement and sign inversion of junction magnetoresistance on Mn substitution in magnetite/p-Siheterostructures, HarinathAireddy and **Amal Kumar Das, Journal of Physics D: Applied Physics, 49 (2016) 415003.**

[70] Multiple caloric effects in geometrically frustrated "114" $CaBaCo_4O_7$ Cobaltite, C. Dhanasekhar, **A. K. Das,** and A.Venimadhav, ***Journal of Magnetism and Magnetic Materials*, 418 (2016) 76.**

[69] Electro-magnetic transport and rectifying property of $Fe_{2.5}Mn_{0.5}O_4$/p-Si heterojunction, H. Aireddy, S. Bhaumik, and **A. K. Das**, **AIP Conf. Proc. 1728, (2016) 020107.**

[68] Structural, magnetic and thermal study of Cr doped iron-tungsten-oxygen system ($Fe_2WO_6$), Archana Kumari, C. DhanaSekhar, and **A. K. Das**, **AIP Conference Proceedings 1731, (2016) 140062.**

[67] Electric field dependence of junction magnetoresistance in magnetite/semiconductor heterostructure at room temperature, H. Aireddy, S. Bhaumik, and **A. K. Das, Appl. Phys. Lett. 107 (2015) 232406.**

[66] Radio Frequency Scanning Tunneling Spectroscopy for Single-Molecule Spin Resonance, Stefan Müllegger, Stefano Tebi, **Amal K. Das**, Wolfgang Schöfberger, Felix Faschinger, and Reinhold Koch, **Phys. Rev. Lett. 113, (2014) 133001.**

[65] Radio-frequency excitation of single molecules by scanning tunnelling microscopy, Stefan Müllegger, **Amal K Das**, KarlheinzMayr and Reinhold Koch, **Nanotechnology 25, (2014) 135705.**

[64] Magnetic Glassy Behavior of Pr0.6Ca0.4MnO3 Nanoparticles: Effect of Intra and Interparticle Magnetic Interactions on Magnetodielectric Property, K. Devi Chandrasekhar, **A. K. Das**, and A. Venimadhav, **J. Phys. Chem. C 118, (2014) 27728.**

[63] Dual functionality of a simple magnetic/semiconductor heterostructure device: Diode and magnetoresistive element, A. Sarkar, R. Adhikari and **A. K. Das, IEEE Trans. Magn. 50, (2014) 4400108.**

[62] Defect-induced room temperature ferromagnetism in SnO2 nanowires controlled by UV light irradiation, S. Bhaumik, A. K. Sinha, S. K. Ray and **A. K. Das, IEEE Trans. Magn. 50, (2014) 2400206.**

[61] Magnetic and transport properties of Mn0.02Sn0.98O2 thin films grown on p-Si varying $O_2$ pressure, S. Bhaumik, S. K. Ray and **A. K. Das, J. Appl. Phys. 115, (2014) 123907.**

[60] Role of defects and oxygen vacancies on dielectric and magnetic propertiesof $Pb^{2+}$ ion doped $LaFeO_3$ polycrystalline ceramics, K. Devi Chandrasekhar, S. Mallesh, J. Krishna Murthy, **A. K. Das**, and A.Venimadhav, **Physica B 448, (2014) 304.**

[59] Investigation of Intrinsic Stress and Transport Properties of Fe/P-Si (001) Schottky Heterojunction, Anirban Sarkar, S. Bhaumik, R. Adhikari1, and **A. K. Das**, International Journal of **Advanced Applied Physics Research 1, (2014) 40.**

[58] Dielectric and Magnetodielectric Properties of $R_2NiMnO_6$ (R = Nd, Eu, Gd, Dy, and Y), Devi Chandrasekhar Kakarla, Krishna Murthy Jyothinagaram, **Amal Kumar Das**, and Venimadhav Adyam, **J. Am. Ceram. Soc. 97, (2014) 2858.**

[57] Temperature-dependent structure and magnetism of Mn-doped Ge nanowires, Sandip Majumdar, S. Bhaumik,K. Rana, S. K. Ray and **A. K. Das, Phys. Status Solidi A 211 (4), (2014) 877.**

[56] Optical and magnetic properties of Er-doped $SnO_2$ nanoparticles, S. Bhaumik, S. K. Ray, and **A. K. Das,Phys. Status Solidi A210, (2013) 2146.**

[55] Giant junction magnetoresistance effect in ferromagnet/semiconductor heterostructures, Anirban Sarkar, RajdeepAdhikari, and **Amal Kumar Das**, **J. Appl. Phys. 114, (2013) 154513.**

[54] Magnetic field induced dielectric relaxation in the strain glass state of$Pr_{0.6}Ca_{0.4}MnO_3$, K. Devi Chandrasekhar, **A. K. Das**, and A. Venimadhav, **J. Appl. Phys. 113, (2013) 173907.**

****[53]** Development of a High Vacuum Cantilever Beam Magnetometer for Measurement of Mechanical and Magnetic Properties of Thin Films, A. Sarkar, R. Adhikari and **A. K. Das, Current Science 104 (7), (2013) 826.**

[52] Self grown core/shell nanoparticles of cobalt: Correlation of structure, transport and magnetism, A. Sarkar, R. Adhikari, N. Behera and **A. K. Das, J. Magn. Magn.Mater. 339,(2013) 20.**

[51] High Dielectric Permittivity in $BaFe_{12}O_{19}$/Polyvinylidene fluoride Composites, K. Devi Chandrsekhar, S. Karthikeyan, **A. K. Das**, and A. Venimadhav, **AIP Conf. Proc. 1512, (2013) 788; doi: 10.1063/1.4791274.**

[50] Spin Valve Effect in $Mn_{0.05}Ge_{0.95}$/p-Si Structure, S. Bhaumik, S. K. Ray and **A. K. Das, Springer Proceedings in Physics 143, 2013, DOI: 10.1007/978-3-642-34216-5_42.**

[49] Impedance and Modulus Spectroscopy Analysis of $Mn_{0.5}Zn_{0.5}Fe_2O_4$ Nanoparticles, H. Aireddy, U. Bidayat, and **A.K. Das, AIP Conf. Proc. 1512, (2013) 328; doi: 10.1063/1.4791044.**

[48] The extrinsic origin of the magnetodielectric effect in the double perovskite $La_2NiMnO_6$, K. Devi Chandrasekhar, **A. K. Das**, C. Mitra and A. Venimadhav**, J. Phys.: Condens. Matter 24 (2012) 495901.**

[47] Spin glass behaviour and extrinsic origin of magnetodielectric effect in non-multiferroic $La_2NiMnO_6$ nanoparticles, K Devi Chandrasekhar, **A K Das** and A Venimadhav, **J. Phys.: Condens. Matter 24, (2012) 376003.**

[46] Correlation between the mechanical and magneto-transport properties of cobalt film on semiconducting substrate, A. Sarkar, R. Adhikari and **A. K. Das, Physica B 407, (2012), 4148.**

[45] Magnetic Schottky diode exploiting spin polarized transport in Co/p-Siheterostructure, A. Sarkar, R. Adhikari and **A. K. Das, Appl. Phys. Lett. 100, (2012) 262402.**

[44] Variation and sign change of magnetostrictive strain as a function of Ni concentration in Ni-substituted $ZnFe_2O_4$ sintered nanoparticles, R. Adhikari, A. Sarkar, Mukta V. Limaye, S. K. Kulkarni, and **A. K. Das,J. Appl. Phys. 111, (2012) 073903.**

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**Description** : By sensitive cantilever beam magnetometry we discovered that$\alpha$-MnAs films on GaAs(001) exhibit an additional small out-of-plane component of the magnetization which is magnetically coupled with the dominant in-plane magnetization. We demonstrate that the switching of the in-plane magnetization (output) can be controlled by the two magnetic fields as independent inputs, thus the $\alpha$-MnAs layer can be utilized as logic gate with non-volatile output. The logic functionality of the layer can be preselected to be AND or OR at run-time, thus offering the perspective for programmable magneto-logic devices.

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