

# **CURRICULUM-VITAE**

## **Dr. Arvind Kumar**

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(Physics)  
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**Google Scholar:** <https://scholar.google.com/citations?user=IrN4WsgAAAAJ&hl=en&authuser=1>

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## **Qualification:**

- Ph.D (Physics), Banaras Hindu University, Varanasi (U.P.) India, 2015.
- M.Sc. (Physics), M.J.P. Rohilkhand University, India, 2010.
- B.Sc (PCM), M.J.P. Rohilkhand University, India, 2010.

## **Ph.D Thesis Title:**

“A study on Co-based alloy, Heusler alloy interfaced with Silicon and effect of swift heavy ion irradiation”

## **Additional Qualification:**

- Council of Scientific & Industrial Research National Eligibility Test (CSIR NET LS and JRF-Dec.2009, 2010).
- Graduate Aptitude Test in Engineering (GATE-2011)

## **Areas of Interest/Specialization**

- To Study the electronic and magnetic properties of magnetic metal/semiconductor interfacial structure, which is a building block of “Spintronic” devices.
- Study of Half metallic alloy (Heusler alloy) and their interfaces, synthesis of Heusler Alloy Nanoparticles
- Exchange Bias structures
- Swift Heavy Ion Irradiation Studies on such interfaces
- Magnetic Nanoparticles, diluted magnetic semiconductor
- Synthesis and characterization of Multiferroic and perovskite materials for photovoltaic solar cells
- **Electronic structure calculations of solids using density functional theory (DFT) by Wien2K and VASP Software**

## **Technical/Characterization Expertise:**

- XRD for structural investigation
- AFM/MFM for surface morphological investigation
- SEM/TEM for surface morphology and microstructural analysis
- XPS for chemical phase identification
- FTIR, UV-vis and Raman Spectroscopy
- Electronic and Magneto-transport from low temperature to RT
- VSM for magnetization measurement
- Experience/ knowledge of swift heavy ion irradiation on such interfaces
- Familiar and friendly with operations of vacuum coating units, FTIR and Uv-Visible
- **Wien2K Software for electronic, magnetic, optical and transport properties of solids for material science**

### **Teaching Experience:**

- “From **Aug. 03, 2015** to **March 04, 2016** as Assistant Professor (**Ad-hoc**) at Atma Ram Sanatan Dharma College, University of Delhi-110021 (India).
- “From **March. 05, 2016** to **April 05, 2023** as Assistant Professor (**Permanent**) at Atma Ram Sanatan Dharma College, University of Delhi-110021 (India).
- “From **April 06, 2023** to **continue** as Assistant Professor (**Permanent**) at School of Physical Sciences, Jawaharlal Nehru University, New Delhi-110067 (India).

### **Awards & Honours:**

- **2010- Gold Medal** for standing first in M.Sc (Physics) awarded by M.J.P. Rohilkhand University Bareilly (U.P.) India.
- **2010- Gold Medal** for standing first in M.Sc (Physics) awarded by Bareilly College, Bareilly (U.P.) India.
- **2009-** Prof. V.K. Saxena Memorial fellowship awarded by Bareilly College, Bareilly (U.P.) India.
- **Member of Ion Beam Society of India**

### **International Collaboration/Consultancy**

## **Best Peer Reviewed Publications**

1. Magnetic, morphological and structural investigations of CoFe/Si Interfacial Structures  
Arvind Kumar, **P. C. Srivastava**  
**Journal of Experimental Nanoscience 10(10) 803-818, (2015)**
2. A study on CoFe/p-Si Interfacial structures before and after swift heavy ion Irradiation  
**Arvind Kumar** and P. C. Srivastava  
**Radiation Effects and Defect in Solids 26 5611–5617 (2015)**
3. Magnetic, structural and transport properties across the Heusler alloy (Co<sub>2</sub>FeAl)/n-Si Interfacial structure  
**Arvind Kumar** and P. C. Srivastava  
**Journal of Materials Science: Materials in Electronics 170 461-476 (2015)**
4. Electronic and magneto-transport across the Heusler alloy (Co<sub>2</sub>FeAl)/p-Si interfacial structure  
**Arvind Kumar** and P. C. Srivastava  
**Journal of Electronic Materials 43(2) 381-388, (2014)**
5. Synthesis and characterization of Co<sub>2</sub>FeAl Heusler Alloy nanoparticles  
**Arvind Kumar**, P. C. Srivastava  
**Materials Science-Poland 31(4) 501-505, (2013)**
6. Effect of swift heavy ion irradiation on magnetic, surface morphology and electronic transport across CoFe/n-Si interfacial structures  
**Arvind Kumar** and P.C.Srivastava  
**Superlattices and Microstructures 92 (2016) 124-133**
7. New insights into CoFe/n-Si interfacial structure as probed by X-ray photoelectron spectroscopy  
**Arvind Kumar**, T. Shripathi and P. C. Srivastava  
**Journal of Science: Advanced Materials and Devices 1 (2016) 290-294**
8. Effect of interfacial modifications on magnetic, morphological and transport properties of CoFe/nSi thin film structures using ion irradiation  
**Arvind Kumar**, Neelabh Srivastava and P.C. Srivastava  
**Nuclear Inst. and Methods in Physics Research B 451 (2019) 79–88**
9. Magnetic and Structural Properties of exchanged coupled Heusler alloy Co<sub>2</sub>FeAl/NiO Interfaces with n-and p-type Silicon Substrates  
**Arvind Kumar**, Neelabh Srivastava and P.C. Srivastava  
**Journal of Electronic Materials 49 (2019) 712-719**
10. Study on thermodynamic, electronic and magnetic properties of RE<sub>2</sub>Cu Cd (RE = Dy-Tm) intermetallics: First-principle calculation  
Naveen Kumar, Sachin Kumar, Kamna Yadav, **Arvind Kumar**, Pawan K. Singh, Neelabh Srivastava and Rishi P. Singh  
**Bull. Mater. Sci. (2020) 43:81**
11. DFT investigations on optoelectronic spectra and thermoelectric properties of barium

cadmium disulphide (BaCdS<sub>2</sub>)

Sachin Kumar, Naveen Kumar<sup>a</sup>, Kamna Yadav, **Arvind Kumar** and R.P.Singh  
**Optik - International Journal for Light and Electron Optics 207 (2020) 163797**

**12.** Structural, dielectric and magnetoelectric coupling analysis in SrBi<sub>2</sub>Nb<sub>2</sub>O<sub>9</sub>-CoFe<sub>2</sub>O<sub>4</sub> composites

Prachi Chaudhary, Manish Kumar, Samiksha Dabas, **Arvind Kumar** and O. P. Thakur  
**Bulletin of Material Science,(2020) 43:247**

**13.** Structural, optical and magneto-electric coupling analysis in „Y“ doped double perovskite La<sub>2</sub>NiMnO<sub>6</sub> nanoparticles

Manish Kumar, Brijmohan Prajapati, Abhishek Singh, Shiv Kumar, **Arvind Kumar**, Srishti Mittal and Aditya  
**Chemical Physics 532 (2020) 110688**

**14.** Effects of Al doping on structural, microstructural and optical properties of ZnO nanoparticles

Shiv Kumar, Manish Kumar, **Arvind Kumar**, Subhash Sharma, Prashant Shahi, Sandip Chatterjee, Anup Kumar Ghosh  
**Journal of Materials Science: Materials in Electronics 31, 7715–7723 (2020)**

**15.** An optimized lead-free formamidinium Sn-based perovskite solar cell design for high power conversion efficiency by SCAPS simulation

Manish Kumar, Abhishek Raj, **Arvind Kumar**, Avneesh Anshul  
**Optical Materials 108 (2020) 110213**

16. Advances and future challenges in multifunctional nanostructures for their role in fast, energy efficient memory devices

Manish Kumar, Arvind Kumar, Avneesh Anshul and Subhash Sharma

**Materials Letter 277 (2020) 128369**

17. Magneto-optical effects in half metallic ferromagnets: Rare earth thallium tellurides (TlXTe<sub>2</sub>; X = Tb-Er)

Annveer, Rahul Gautam, Aman Kumar, **Arvind Kumar**, Pawan K Singh and Rish P Singh

**Optik - International Journal for Light and Electron Optics 223 (2020) 165317**

18. Progress in multiferroic and magnetoelectric materials: Applications, opportunities and challenges.

Manish Kumar, S. Shankar, **Arvind Kumar**, Avneesh Anshul, M. Jayasimhadri, O. P. Thakur

**Journal of Materials Science: Materials in Electronics 31, 19487–19510 (2020)**

19. Study of optoelectronic and thermoelectric spectra of Tl(Nd/Gd)S<sub>2</sub>

Annveer, Rishi P. Singh, **Arvind Kumar**, Yogendra K. Gautam, Rahul Gautam and Aman Kumar and Achhe Lal Saroj

**Journal of Materials Science: Materials in Electronics 32,727-744 (2021)**

20. Magnetic, opto-electronic and thermodynamic properties of half metallic double perovskite oxide, Ba<sub>2</sub>YbTaO<sub>6</sub>: A Density Functional Theory Study

**Arvind Kumar**, Manish Kumar and R.P. Singh

**Journal of Materials Science: Materials in Electronics 32, 12951–12965 (2021)**

21. Opto-electronic, magnetic, thermodynamic and thermoelectric properties of cubic perovskite SrMnO<sub>3</sub>: A first principle based Spin polarized calculation

**Arvind Kumar**, Manish Kumar, Rishi P. Singh and Pawan K. Singh

**Solid State Communications 324, 114139 (2021)**

22. Effect of spin-orbit coupling on opto-electronic and magnetic properties of rare earth terbium di-oxide (TbO<sub>2</sub>): First Principle Calculations

**Arvind Kumar**, Manish Kumar and Rishi P. Singh

**The European Physical Journal Plus 135, 939 (2020)**

23. Opto-electronic properties of HfO<sub>2</sub>: A first principle-based spin-polarized calculations

Manish Kumar, Rishi P Singh, **Arvind Kumar**

**Optik - International Journal for Light and Electron Optics 226 (2021)165937**

24. Structural, electronic, magnetic and optical properties of double perovskite

Nd<sub>2</sub>CoMnO<sub>6</sub>: First Principle Calculations

Manish Kumar, Abhishek Raj, **Arvind Kumar**, Subhash Sharma, Hemant Bherwani, Ankit Gupta, Avneesh Anshul

**Optik- International Journal for Light and Electron 242, 166764 (2021)**

25. Study on electronic, magnetic, optical and thermoelectric properties of manganese oxide (MnO): DFT based spin polarized calculations  
**Arvind Kumar**, Manish Kumar and RishiPal Singh  
**Optik- International Journal for Light and Electron** 241, 167064 (2021)
26. Theoretical evidence of high power conversion efficiency in double perovskite solar cell device  
Manish Kumar, Abhishek Raj, **Arvind Kumar**, Avneesh Anshul  
**Optical Materials** 111, 110565 (2021)
27. Structural, magnetic and optical properties of diluted magnetic semiconductor (DMS) phase of Ni modified CuO nanoparticles  
**Arvind Kumar**, Manish Kumar, Prakash C Sati, Manish K Srivastava, Surajit Ghosh, Shiv Kumar  
**Current Applied Physics**, 32 (2021)24-35.
28. Effect of band-gap tuning on lead-free double perovskite heterostructure devices for photovoltaic applications via SCAPS simulation  
Manish Kumar, Abhishek Raj, **Arvind Kumar**, Avneesh Anshul  
**Materials Today Communications** 26 (2021) 101851.
29. Effect of spin orbit coupling effect on opto-electronic, magnetic properties of full Heusler alloy, Ru<sub>2</sub>CrAl for spintronic and optical devices: Theoretical investigations using DFT  
**Arvind Kumar**, Swati, Manish Kumar and Rishi P. Singh  
Optik 249,168250 (2022)
30. Low temperature magnetic study and first principle calculation in “Mo” doped CoFe<sub>2</sub>O<sub>4</sub> for magnetic information storage applications  
Manish Kumara, **Arvind Kumar**, Abhishek Singh, Avneesh Anshul, Subhash Sharma, Prakash Chandr Sati  
**Journal of alloys and compounds** 896, 163074 (2022)
31. Effect of doping engineering in TiO<sub>2</sub> electron transport layer on photovoltaic performance of perovskite solar cells  
Abhishek Raj, Manish Kumar, **Arvind Kumar**, Amel Laref, Kedar Singh, Subhash Sharma, Avneesh Anshul  
**Materials Letter**, 313 (2022), 131692
32. Computational analysis of bandgap tuning, admittance and impedance spectroscopy measurements in lead-free MASnI<sub>3</sub> perovskite solar cell device"  
Manish Kumar, Abhishek Raj, **Arvind Kumar**, Pramod K. Singh, Ram Chandra Singh, Avneesh Anshul  
**International journal of energy research**, 2022;1–14; DOI:10.1002/er.7942
33. Theoretical investigations on electronic and optical properties of Half Heusler alloy, FeNbSb  
**Arvind Kumar**, Swati, Brijmohan Prajapati, Manish Kumar, Rishi P. Singh  
**Optical and quantum electronics** 54(2022) 717

**34.** Fabrication of low-cost and fast-response visible photodetector based on ZnS:Mn/p-Si heterojunction  
Arun Kumar, Samrat Mukherjee, Himanshu Sharma, Devendra Kumar Rana, **Arvind Kumar**, Raj Kumar, Ravi Kant Choubey  
**Materials Science in Semiconductor Processing**, 155 (2023) 107226

**35.** Magneto-electronic and optical properties of full Heusler alloy, Y<sub>2</sub>FeSi: A first principle calculation with and without spin orbit coupling effect  
**Arvind Kumar**, Swati, Vikrant Chaudhary, Manish Kumar, Gaurav Sharma, V. P. Singh and Rishi P. Singh  
**Journal of Superconductivity and Novel Magnetism**, (2022) 35:2079–2089

**36.** Investigating the potential of lead-free double perovskite Cs<sub>2</sub>AgBiBr<sub>6</sub> material for solar cell applications: A theoretical study  
Abhishek Raj, Manish Kumar, Arvind Kumar, Amel Laref, Avneesh Anshul  
**International journal of energy research**, (2022)  
<https://doi.org/10.1002/er.8099>

### **Book Chapters:**

#### **1. Chapter: 13 Nanoscale Characterization**

Arvind Kumar, Swati, Manish Kumar, Neelabh Srivastava and Anadi Krishna Atul  
CRC Press (Accepted)

#### **2. Multiferroic Bismuth Ferrite Based Nanostructures: Synthesis, Characterization and Applications**

Manish Kumar, Abhishek Raj, Arvind Kumar, Avneesh Anshul  
(Accepted)

#### **3. Lead-free multiferroic BiFeO<sub>3</sub> based sustainable green composites: Applications, opportunities and future challenges**

Manish Kumar, Arvind Kumar, Satyam, Z. R. Khan  
CRC Press (Accepted)

### **Recent Peer Reviewed Journals/Books**

### **Patents (if any)**