



Dr. Sapna Sharma
Associate Professor
Department of Physics
St. Bede's College, Shimla



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Associate Professor

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EDUCATIONAL QUALIFICATIONS: M.Sc. (Gold Medal), M.Phil. (Gold Medal), Ph.D., PG Diploma in MCMIS

Sr. No.	Degree	Subject	College/University	Year of Passing
1	B.Sc.	Physics	RKMV, Shimla	1987
2	M.Sc.	Physics	Himachal Pradesh University	1989
3	M.Phil.	Physics	Himachal Pradesh University	1990
4	P G Diploma	MIS & MC	Maastricht School of Management, The Netherlands	1999
5	Ph.D.	Physics	Himachal Pradesh University	2014
6	Specialization	Physics	Himachal Pradesh University	Condensed Matter Physics/ Physics Education Research

TOTAL TEACHING EXPERIENCE: 30 Years

Teaching Experience at St. Bede's College: 30 years



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RESEARCH EXPERIENCE: Major/Minor Project:

UGC Minor Research Project (March 2010- August 2011) titled '*Effectiveness of research based instructional strategies in teaching Solid State Physics course at Undergraduate level: An Empirical Study*'.

SUBJECTS TAUGHT

Mechanics, Thermal & Statistical Physics, Computational Physics, Elements of Modern Physics, Quantum Mechanics, Solid state Physics, Nuclear & Particle Physics, Vibrations & Waves, Optics

OTHER RESPONSIBILITIES

Managing Editor: Journal of Research: The Bede Athenaeum

Academic Monitor (Science)

Incharge: Time Table Committee (Science), Research Promotion Cell, NAAC Criteria VI

Member: IQAC, RUSA Committee, Prospectus Committee, PTA, Women Anti-Harassment Cell, Admission Committee, NSS program Officer (2014-2018)

ACHIEVEMENTS

❖ PUBLICATIONS

➤ Books Edited

Edited the special issue on Physics Education Research of the journal:
Journal of Research: The Bede Athenaeum Volume 3, No. (1) 2012



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➤ **Selective Paper Publications**

- i. O.S.K.S. Sastri, Swathi, S. Deepa and **Sapna Sharma** 'Video Analysis of Double Pendulum using Tracker' *The Bede Athenaeum*, **12**, (1), 33-42 (2021)
- ii. **Sharma**, SAhluwalia, P. K. 'Particle in a confining potential...' Proceedings in epiSTEME-8 An International Conference, HBSCE (TIFR), Mumbai, 2020, ISBN 9788194156796
- iii. **Sharma**, SAhluwalia, P. K., 'Alternative approaches in digital era to handle undergraduate physics (mechanics) laboratory:...' in *Journal of Physics: conference Series (1512)* 2020, published by **IOP**
- iv. **Sharma**, SAhluwalia, P. K., 'Can Virtual Labs Become a New Normal? A Case Study of Millikan's Oil Drop Experiment' *European Journal of Physics* **39** (2018)065804
- v. **Sharma**, SAhluwalia, P. K., 'Diagnosing Alternative Conceptions in the Nature of Thermodynamic Variables and Entropy' Proceedings in epiSTEME-6 An International Conference, HBSCE (TIFR), Mumbai, 2015
- vi. **Sharma**, S., Ahluwalia, P. K., 'Research Based Teaching and Use of Clickers in the Classroom: A Case Study', *WASD Outlook 2015* ISBN 1748-8133, *Routledge/ Greenleaf*
- vii. **Sharma**, S., Ahluwalia, P. K., and Sharma, S. K., Students' 'Epistemological Beliefs, Expectations and Learning Physics: An International Comparison', *Phys. Rev. Sp. Topic Physics Education Research*, **9**, (2013), 010117
- viii. **Sharma**, S., Ahluwalia, P. K., 'Diagnosing Alternative Conceptions of Fermi energy Among Undergraduate Students', *European Journal of Physics*, **33**, 883-895 (2012).
- ix. **Sharma**, S., Ahluwalia, P. K., Development and Administration of Concept Survey on Wave Particle Duality and Uncertainty Principle...' in Proceedings of the World Conference on Physics Education (WCPE) – 2012 Istanbul, Turkey, ISBN 978-605-364-658-7, Pegem Akademi.
- x. **Sharma**, S., Ahluwalia, P. K., A Mismatch between Learning Styles and Teaching Styles, its Influence: An Empirical Study', *Journal of Research: The Bede Athenaeum*, **3**, (1), 52-55 (2012)
- xi. Kumar, A., **Sharma**, S., Sharma, J. D., Ahluwalia, P. K., 'Making Computational Physics an Integral Part of Physics Curriculum: Current Scenario & Possible Strategies', *Journal of Research: The Bede*



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- Athenaeum*, 3, (1), 71-75 (2012)
- xii. Ahluwalia, P. K., **Sharma, S.**, 'Epistemological Beliefs, Expectations and Physics Learning', *Physics News: Bulletin of Indian Physics Association: Special issue on Physics Education Research*, **41**, 58-68 (2011).
- xiii. **Sharma, S.**, Sastri, OSKS, Ahluwalia, P. K., 'Design of IO of Undergraduate Solid State Physics Course...', *AIP Conference Proceedings in International Conference of Physics Education (ICPE) 2009, published by American Institute of Physics*, **1263**, 171-174.(2010), ISBN: 9780735408166
- xiv. **Sharma, S.**, Ahluwalia, P. K., 'Towards Cognitive Coherence in Physics Learning: Imageability of Undergraduate Solid State Physics Course', *AIP Conference Proceedings in International Conference of Physics Education (ICPE) 2009, published by American Institute of Physics*, **1263**, 94-97. (2010), ISBN: 9780735408166

❖ Paper Presentations

In International Conference

- i. Poster presentation 'Particle in a confining potential....' in *epiSTEME-8 an International Conference* held on 3-6 January 2020 at HBSCE (TIFR), Mumbai.
- ii. Oral presentation 'Alternative approaches in digital era....' in *ICPE at Johannesburg, South Africa* held on 1 – 5 October, 2018.
- iii. Poster presentation 'A sustainable solution for the prevention of forest fire and its early detection using WSN...' in *International Conference on Biodiversity: Current Scenario & Future Strategies* 6-8 October, 2016 held at St. Bede's College, Shimla
- iv. Oral presentation 'Diagnosing Alternative Conceptions in the Nature of Thermodynamic Variables and Entropy' in *epiSTEME-6 an International Conference* 15-18 December 2015, held at HBSCE (TIFR), Mumbai,
- v. Oral presentation 'Development and administration of Concept Survey on wave particle duality and uncertainty principle...' in *The World Conference on Physics Education (WCPE) 2012 at Istanbul, Turkey*.
- vi. Oral presentation 'Design of IO of Undergraduate Solid State Physics Course...' in the *International Conference on Physics Education Research (ICPE)*, held at Bangkok, Thailand
- vii. Oral presentation 'Towards Cognitive Coherence in Physics Learning:



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Imageability of Undergraduate Solid State Physics Course', in the *International Conference on Physics Education Research (ICPE), held at Bangkok, Thailand.*

In National Conferences

- viii. Oral Presentation 'Revisiting Science Laboratories in a Virtual World: A Perception Survey in Context of Physics Experiments' in National Conference NCISCA, held at H.P. University, Shimla (30-31 March 2018)
- ix. Oral Presentation 'Converting a Demo into Quantitative Measurements Using Tracker Software' in Annual Convention and National Symposium of IAPT at Gurukul Kangri Vishwavidyalaya, Haridwar (29-31 October, 2017)
- x. Oral Presentation in Annual Convention of IAPT (20-22 October, 2016) at Ahmedabad
- xi. Oral Presentation in Annual Convention of IAPT at Hyderabad on the topic 'Virtual vs Hands-on Laboratory....'(30th October 2015 to 1st November 2015)
- xii. Oral Presentation in First Himachal Science Congress on the topic 'Role of Management Information System (MIS) in Sustainability of Quality Higher Education: A Case Study' held at Shimla on 15-16 October, 2014.
- xiii. Oral Presentation in Annual Convention of IAPT 'Spoken Tutorials Assisted Learning in Physics Classroom for Enhancing Multi-representation Skills...' held at Chandigarh on 10-12 October, 2014
- xiv. Oral Presentation 'Particle in a Box Problem in Quantum Mechanics...' in Annual Convention of IAPT held at Kolkata 26-28 October, 2013
- xv. Oral Presentation 'Overcoming Interpretation Barrier of Multiple Representations in Undergraduate Statistical Mechanics Using Spreadsheets in Annual Convention of IAPT held at Jaipur, Rajasthan in October 2011
- xvi. Oral Presentation 'Development of Concept Survey Instrument for Statistical Physics Concepts in the Backdrop of Solid-State Physics Course' in Annual Convention of IAPT held at Rajkot in October 2010
- xvii. Oral Presentation 'Video Motion Based Analysis Using Web cam and Tracker software to Study Flywheel Experiment' in Annual Convention of IAPT at Bangalore in October 2008



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Participation in Conferences and Seminars

A. Refresher and Orientation Courses

- i. 4-Week Orientation Programme organised by Academic Staff College, H.P. University from 09-04-2001 to 05-05-2001.
- ii. 3-week 'Refresher Course in Computer' conducted by Academic Staff College, H.P. University from 17-4-1995 to 6-5-1995
- iii. 3-week 'Refresher Course in Computational Physics' conducted by Academic Staff College, H.P. University from 18th May 1992 to June 6th, 1992.

B. Workshops/ Seminars / FDP

- i. Webinar on 21st September 2020 on National Education Policy-Higher Education organized by St. Bede's College Shimla
- ii. Two-week online FDP (July 25-August 10, 2020) on "Managing Online Classes and Co-Creating MOOCs 3.0" under the most coveted MHRD-sponsored Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNTT), **organized by** Teaching Learning Centre (TLC), Ramanujan College **in association with** Research Development and Services Cell, Ramanujan College, University of Delhi.
- iii. Two-week online FDP (July 25-August 10, 2020) on Advanced Concepts for Developing MOOCs' **under the most coveted** MHRD-sponsored Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNTT), **organized by** Teaching Learning Centre (TLC), Ramanujan College **in association with** Research Development and Services Cell, Ramanujan College, University of Delhi.
- iv. Two-day online FDP (4- 5 August, 2020) on Online Teaching Tools organized by St. Bede's College Shimla
- v. A 4-day Teacher Development workshop (December 10-13, 2019) on Thermal Physics & Statistical Mechanics at Homi Bhabha Centre for Science Education, Anushaktinagar, TIFR Mumbai.
- vi. A one-week National workshop *In Silico Approach for Modeling New Materials: Methodology & Applications* (14-20 January 2019) at



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- Department of Physics and Astronomical Science (DPAS); Central University of Himachal Pradesh (CUHP), Dharamshala
- vii. A 3-day workshop (January 10-12, 2018) on Active Learning in Optics and Photonics and Experimental Problem Solving in Physics at Homi Bhabha Centre for Science Education, Anushaktinagar, TIFR Mumbai.
 - viii. Preparatory School to the Winter College on Optics: Advanced Optical Techniques for Bio-imaging (smr3169) at the Abdus Salam Centre for Theoretical Physics (ICTP) Italy from (6-10 February 2017)
 - ix. Preparatory workshop for 46th International Physics Olympiad at Homi Bhabha Centre for Science Education TIFR as member of Academic Assessment Group from 5-12 July, 2015.
 - x. A 2-Day Workshop on “Design and Development of Physics Curriculum for Excellence” organised by UGC- Academic Staff College, H.P. University on 25-26 March, 2007.
 - xi. XXII IAPT Convention and Symposium held at Physics Department, H.P. University from 27-29 October, 2007.

C. Workshops/ Seminars Organized as a

- i. Convener in a six-day online workshop entitled ‘**Spreadsheets: A Tool for Developing Mathematical & Computational Skills in UG students**’ from 15th to 20th February 2021.
- ii. Convener in a one-day Seminar entitled ‘*Patterns in Nature and Discoveries in Science*’ on 13 September, 2019 to mark the 150th Anniversary of Periodic Table of Chemical Elements and to celebrate International Year of Periodic Table.
- iii. Convener in a one day workshop in collaboration with Jaypee University Wagnaghat to celebrate Science Day on the theme “*Science for the people and people for science*” on 28 February, 2019
- iv. Convener in a one-day National Seminar entitled ‘*Celebrating Indian Science: From Past to Future*’ held in collaboration with Indian Science Congress Association (ISCA) Shimla Chapter at St. Bede’s College Shimla on 13 September, 2018.
- v. Convener in a one-day workshop on the theme “**Science & Technology for a Sustainable Future**” held on 28 February, 2018 at St. Bede’s College Shimla.
- vi. Convener in Two days National Workshop ‘**A Celebration of Science through Stage Shows, Lectures and Panel Discussions**’ held on 10-11



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- August, 2017, at St. Bede's college Shimla
- vii. Received UGC assistance to conduct a seminar/workshop and organized a workshop cum seminar as organizing secretary on '*Physics Education Research (PER): Research Based Reforms in Physics Instructions*' at St. Bede's College Shimla, May 2011
 - viii. Organizing member in International Conference on '*Biodiversity: Current Scenario & Future Strategies*' held at St. Bede's College Shimla, on 6-8 October, 2016
 - ix. Organizing member in ICSSR sponsored International Conference on '*Work Stress and Health: Recent Perceptions, Future Trends*' held in October, 2015 at St. Bede's College Shimla
 - x. Organizing member in NAAC sponsored National Seminar on '*Institutional Quality Improvement: Role of ICT*' held on 14-15 November, 2014 at St. Bede's College Shimla

❖ Resource Person

- i. Delivered talks on 23rd and 24th February 2021, in a six-day Online workshop on '*Enhancing Mathematical and Computational Skills using Spreadsheets*' organized by Physics department, Gargi College, New Delhi.
- ii. Delivered talks on 17th and 18th February 2021, in a six-day Online workshop on '*A Tool for Developing Mathematical & Computational Skills in UG students*' organized by Physics department, St. Bede's College Shimla
- iii. Delivered talks on 29th and 30th January 2021, in a six-day Online workshop on '*Computations with Microsoft's Excel-Spreadsheets and Spreadsheet as a toolkit for Science Laboratories*' organized by Physics department, D.A.V College Bathinda
- iv. Delivered a talk on 30th September 2020 in One-day Online National Workshop on '*Virtual Laboratories*' organized by Physics department, Himachal Pradesh Technical University Hamirpur.
- v. Delivered a talk on 20th September 2020 in One-day DBT sponsored Webinar on '*Virtual Laboratories*' organized by Physics department, D.A.V. college Bathinda
- vi. Delivered a talk on 5th June 2020 in One-day Webinar on '*Building a learning Bridge Across e-highways*' organized by Physics department,



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School of Basic & Applied Sciences Maharaja Agarsen University.

- vii. delivered a talk on 24th May 2020 on 'Post Covid 19 Pandemic Challenges in Higher Education' organized by Faculty of Performing and Visual Arts, H. P. University.
- viii. On 26th February 2020 in one-week Short Term Course on MOOCs, E-Content Development and Open Educational Resources at UGC Human Resource Development Centre Himachal Pradesh University Shimla
- ix. Delivered a talk in One Day Interactive Workshop on "Patterns in Nature and Discoveries in Sciences" on November 15, 2019 at Bahra University Wahnaghat.
- x. Delivered a talk in One Day National Seminar on Scientific Developments: Quest for Excellence on 14th March 2019 at APG University Shimla.
- xi. Delivered talks on MOOCs at UGC Human Resource Development Centre Himachal Pradesh University Shimla.
- xii. Delivered talks in 3 weeks Refresher Course Academic conducted by Academic Staff College, H.P. University, Shimla, Himachal Pradesh
- xiii. Delivered a talk in International Conference on Nanotechnology **ALIGARH NANO-V and STEMCON16**, held at Aligarh Muslim University in Aligarh, Uttar Pradesh, India during March 12-15, 2016.
- xiv. Delivered talks in 12 days In Service Course for PGT (Physics) held at Kendriya Vidyalaya Jakhoo Hills Shimla in May 2016
- xv. Delivered talks in 12 days In Service Course for PGT (Physics) held at Kendriya Vidyalaya Chandigarh in December 2016
- xvi. Delivered a talk in National Workshop-Cum Orientation Program on "Quality Assurance in Higher Education" under Faculty Development Program in November 2013
- xvii. Delivered a talk in Zonal Convention cum Workshop on Education in Physics and Related Sciences: Structure and Delivery in Classroom for 21st Century at Guru Nanak Public School Ludhiana, Punjab in Nov. 2011

❖ **Discussant**

- Special Invitee to attend the meeting of UG Board of Studies to design the syllabus and course structure under CBCS for B.Sc. Physics at Himachal Pradesh University, Shimla on June 2016.



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❖ **Member of Organisations**

- Life member of Indian Association of Physics Teachers (IAPT),
- Former EC member of IAPT RC3
- Life member of Vijnana Bharati.

❖ **Awards**

- Gold Medal in M.Sc. Physics (H.P. University)
- Gold Medal in M.Phil. Physics (H.P. University)
- Awarded Fellowship from Govt. of Netherlands for Post Graduate Diploma in MCMIS at the Maastricht School of Management (MSM), Maastricht, (May- August)1999.
- Best Paper Presentation (oral) Award in 23rd Indian Association of Physics Teachers (IAPT) Convention held at Bangalore from 17th to 19th October 2008
- The paper 'Double Pendulum Using a PC' authored by Swathi, Deepa S and **Sapna Sharma** was selected among the best ten entries in the National Competition on Innovation in Computer Programming (NCICP) organized by the Indian Association of Physics Teachers (IAPT) and subsequently won the first Prize after presentation in the Annual Convention of IAPT held at the Centre for Development of Physics Education (CPDE), University of Rajasthan on 11 October, 2011.
- Best Paper Presentation (Poster) Award in International Conference on *Biodiversity: Current Scenario & Future Strategies* held at St. Bede's College, Shimla on 6th-8th Oct, 2016