

CURRICULUM-VITAE

DR. BRIJESH KUMAR SINGH

CORRESPONDANCE ADDRESS

Dr. Brijesh Kumar Singh,
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HOME ADDRESS:

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CAREER OBJECTIVE

To contribute best of my knowledge, skills and ability in the growth of my organization, and to attain new heights in my field of work, through effective use of available technology, techniques and constant learning.

PROFESSIONAL QUALIFICATION

- Currently **Assistant Professor** in Physics department, Central University of Rajasthan, Ajmer, January 2017- Present
- **Postdoc Fellow** in School of Electrical Engineering, Tel Aviv University, Israel, November 2014 – January 2017
- **Ph.D.** awarded on thesis title “**Internal Energy Flows in Phase Singular Beams and their Applications in Laser Beam Shaping and Optical Tweezers**” from physics department of **Indian Institute of Technology Delhi (I.I.T. Delhi)**, in February 2015
- M.Sc. in Physics from D. D. U. G. University, Gorakhpur, U.P., India with 69.5%, in 2007
- B.Sc. in Physics, Mathematics, Industrial Chemistry from D. D. U. G. University, Gorakhpur, U.P., India with 70.05%, in 2005
- Higher Secondary from U.P. Board, in 2002 (Mathematics, Physics, Chemistry, Hindi & English)
- High School from U.P. Board, in 2000 (Mathematics, Science, Social Science, Drawing, Hindi & English)

ACHIEVEMENTS, AWARDS AND FELLOWSHIP

- **Nano- Center Post Doc Fellowship** in School of Electrical Engineering, Tel Aviv University, Israel (November 2014-January 2017)
- CSIR-UGC NET (National Eligibility Test) qualified for Junior Research Fellowship (JRF) conducted by CSIR in 2009
- Secured 72th AIR rank in the Joint Entrance Screening Test (JEST) for Physics, 2009
- Secured 272th rank (All India Rank) in the Graduate Aptitude Test in Engineering (GATE) for Physical Science in 2010
- Qualified for JRF in S. N. Bose National Centre for Basics Sciences, Kolkata, India, 2009

- **Best Poster Award** in **LMI workshop, Israel** 2016
- **Best Poster Award** in **WRAP conference, Delhi** 2013
- **Tel Aviv Nano Center** international travel grant to attend conference SPIE 2016 in Belgium
- **Young scientist** DST international travel grant to attend conference SPIE 2018 in USA

PROFESSIONAL EXPERIENCE

- UGC – SRF (Senior Research Fellowship) 2011-2014, Department of Physics, Indian Institute of Technology Delhi, New Delhi, India
- UGC – JRF (Junior Research Fellowship) 2009-2011, Physics, IIT Delhi, India
- Three years Teaching Assistantship in B Tech IInd year Engineering Physics Laboratory, Department of Physics, IIT Delhi, India
- Six months Teaching Assistantship in B Tech Ist year Optics Laboratory, IIT Delhi
- Six months Teaching Assistantship in NIN100 Course of B Tech Ist year, IIT Delhi
- Mentor of **eleven Master and four UG project** students in 2017-2021
- Mentor of **four Ph.D. students** in 2017-2021

OTHER ADMINISTRATIVE EXPERIENCE

- **Co-convener** of **International Symposium on Photonics and Plasmonics (ISPP-2019)**, 23-24 September 2019
- **Ph.D. Advisor**, Physics department, Central University of Rajasthan, 2018-2019
- **Faculty Advisor of M.Sc. students**, Central University of Rajasthan, 2017-2018
- **Organizing committee members** of National Symposium on Technologically Advanced Functional Materials (**NSTAFM-2017**), March 16-17, 2017, Physics department, Central University of Rajasthan, Ajmer, India
- **Organizing committee members** of International OSA Network of Students **IONS -1, Delhi**, IIT Delhi, India, December 1-2, 2011
- **Vice-president** of Badminton club, Central University of Rajasthan, 2017-2018
- **Program Co-ordinator** Physics students of Integrated M.Sc. (5Y) 2020-2021

AREA OF SPECIALIZATION

- Super-oscillating laser beams
- Optical Microscopy and Image Processing
- Laser beam spot beyond the diffraction limit
- Controlled shaping of laser modes
- Phase singular beams, Non-diffracting and Self-healing beams
- Optical tracking of crack propagation in glass plates
- High-resolution optical Trapping
- Optical self-healing beam
- Optical Metrology & Polarization singularity
- Ultrafast laser beam shaping

FIELDS OF INTEREST

- Super-resolution microscopy
- Coherence and Polarization optics
- Bio-photonics & Pattern Recognition
- Diffractive Optics & Photonics crystals
- Adaptive optics, Propagation of optical field in turbulent media, speckles
- Bio medical Optics & Fiber Optics

SPONSORED/CONSULTANCY PROJECTS

- UGC BSR Research Startup Grant No.F.30-356/2017(BSR) of Rs. 10,00,000 (2017-2019)
- Core Research Grant No. CRG/2019/001187 (DST/SERB) of Rs. 33,18,832 (2020-2023)

INTERNATIONAL JOURNAL PUBLICATIONS

1. Hemant Kumar Meena, **Brijesh Kumar Singh**, "Controlled modulation of optical energy in the high order Hermite-Gaussian laser modes", **Optik**, 232, 1-11 (2021). (I.F.-2.18)
2. Hemant Kumar Meena, Bhavesh Pant, **Brijesh Kumar Singh**, "Evolution of elegant, standard, and modulated high order Hermite-Gaussian laser modes in free space", **Asian Journal of Physics**, 30, 1-13 (2021).
3. **Brijesh Kumar Singh**, D. S. Mehta, P. Senthilkumaran, "Interferometric visualization of crack growth in glass plate", **Applied Physics B**, 125, 1-7 (2019). (I.F.-2.07)
4. **Brijesh Kumar Singh**, Harel Nagar, Yael Roichman, Ady Arie, "Particle manipulation beyond the diffraction limit using structured super-oscillating light beams", **Light Science & Applications (Nature Publishing Group)** 6, e17050, 1-6 (2017). (I.F.-17.78)
5. Y Eliezer, **Brijesh Kumar Singh**, L. Hareli, A. Bahbad, A Arie, "Experimental realization of structured super-oscillatory pulses", **Optics Express** 26, 4933-4941 (2018). (I.F.-3.894)
6. **Brijesh Kumar Singh**, Roei Remez, Yuval Tsur, Ady Arie, "Measurement of acceleration and orbital angular momentum of Airy beam and Airy-vortex beam by astigmatic transformation", **Optics Letters** 40, 5411-5414 (2015). (I.F.- 3.766)
7. **Brijesh Kumar Singh**, Roei Remez, Yuval Tsur, Ady Arie, "Super Airy beam: Self accelerating beam with intensified main lobe", **Optics Letters** 40, 4703-4706 (2015). (I.F.-3.766)
8. **Brijesh Kumar Singh**, D. S. Mehta, P. Senthilkumaran, "Controlled modulation of laser beam and dynamic patterning of colloidal particles using optical tweezers", **Journal of Modern Optics** 63, 269-275 (2016). (I.F.-1.657)
9. M. Bahl, **Brijesh Kumar Singh**, Rakesh Kumar Singh, P. Senthilkumaran, "Internal energy flows of coma-affected singular beams in low-numerical-aperture systems", **Journal of Optical Society of America A** 32, 514-521 (2015). (I.F.-2.129)

10. **Brijesh Kumar Singh**, D. S. Mehta, P. Senthilkumaran, "Conical Light Sword Optical Beam and Its Healing Property", **Optics Letters** **39**, 2064-2067 (2014). (I.F.- 3.766)
11. Ranjeet Kumar, **Brijesh Kumar Singh**, Rakesh Kumar Singh, D. S. Mehta, "Optical Cogwheel' And 'Defocused Beam' for 2D Multiparticle Patterned Trapping", International Journal of Engineering Research & Technology (**IJERT**) **2**, 69-73 (2013). (I.F.-1.76)
12. **Brijesh Kumar Singh**, D. S. Mehta, P. Senthilkumaran, "Visualization of Internal Energy Flows in an Optical Field Carrying Pair of Fractional Vortices", **Journal of Modern Optics** **60**, 1027-1036 (2013). (I.F.-1.657)
13. **Brijesh Kumar Singh**, Monika Bahl, D. S. Mehta, P. Senthilkumaran, "Study of Internal Energy Flows in Dipole Vortex Beams by Knife Edge Test", **Optics Communications** **293**, 15-21 (2013). (I.F.-2.125)
14. **Brijesh Kumar Singh**, G. Singh, P. Senthilkumaran, and D. S. Mehta, "Generation of Optical Vortex Arrays Using Single-Element Reversed-Wavefront Folding Interferometer", **International Journal of Optics**, **2012**, Article ID 689612, 7 pages, 2012. doi:10.1155/2012/689612. (I.F.-1.167)
15. **Brijesh Kumar Singh**, Harel Nagar, Yael Roichman, and Ady Arie, "Stiff trap using Super-oscillations optical beams", Proceedings of **SPIE**, Volume 10723, Optical Trapping and Optical Micromanipulation XV; **1072303** (2018) <https://doi.org/10.1117/12.2325027>; **SPIE Photonics 2018**: International conference on optics & photonics, San Diego, California, United States, August 19-23, 2018.
16. **Brijesh Kumar Singh**, Roei Remez, Yuval Tsur, Ady Arie, "Non-diffracting Super Airy beam with intensified main lobe", Proceedings of **SPIE**, volume **98960Z** (29 April 2016); doi: 10.1117/12.2225881; **SPIE Photonics Europe 2016**: International conference on optics & photonics, Brussels, Belgium, April 3-7, 2016.
17. **Brijesh Kumar Singh**, D. S. Mehta, P. Senthilkumaran, "Vortices in Helico-Conical Beam and Fractional Vortex Beam", Proceedings of **IEEE Xplore**, 14663408, DOI: 10.1109/WRAP.2013.6917623, **WRAP2013**: Workshop on Recent Advances in Photonics, IIT Delhi, India, December 17-18, 2013.
18. **Brijesh Kumar Singh**, Rakesh Kumar Singh, D. S. Mehta, P. Senthilkumaran, "Controlled Generation of Periodic Polarization Structure by Interference", Proceedings of **IEEE Xplore**, 14663381, DOI: 10.1109/WRAP.2013.6917624, **WRAP2013**: Workshop on Recent Advances in Photonics, IIT Delhi, India, December 17-18, 2013.
19. Vishal Srivastava, M. Inam, **Brijesh Kumar Singh**, D. S. Mehta, "High Resolution Corneal topography and Tomography of Fish Eye Using Full-Field White Light Interference Microscopy with Color Fringe Analysis", Proceedings of **IEEE Xplore**,

14651209, DOI: 10.1109/WRAP.2013.6917679, **WRAP2013**: Workshop on Recent Advances in Photonics, IIT Delhi, India, December 17-18, 2013 (**Best poster award**).

20. **Brijesh Kumar Singh**, D. S. Mehta, P. Senthilkumaran, "Generation of Optical Vortices Using Cracked Glass Plate", **Photonics 2012**, In proceedings **IEEE Xplore**, 13583874, (25/06/2013); Electronic ISBN: 978-1-55752-959-0, OSA2012, the International Conference on Fiber Optics and Photonics, IIT Madras, December 9-12, 2012.

CONFERENCES/WORKSHOPS/SYMPOSIUMS

1. Hemant Kumar Meena, Brijesh Kumar Mishra, and **Brijesh Kumar Singh**, "Controlled shaping of high order Laguerre-Gaussian laser modes" **Frontiers in Optics and Photonics (FOP21)**, Indian Institute of Technology Delhi, India 24-27 September 2021.
2. Bhavesh Pant, Ram Kalyan, and **Brijesh Kumar Singh**, "Flat-top focusing with radially polarized vector beam" **Frontiers in Optics and Photonics (FOP21)**, Indian Institute of Technology Delhi, India 24-27 September 2021.
3. Hemant Kumar Meena, Mamata, and **Brijesh Kumar Singh**, "Modulation of optical energy in the higher order Hermite-Gaussian mode" **International Conference on Optics and Electro-Optics, (ICOL-2019)**, Instruments R&D Establishment (IRDE), Dehradun, India 19-22 October 2019.
4. Hemant Kumar Meena, and **Brijesh Kumar Singh**, "Optimization of optical energy in the Higher order Laser Modes" **International Symposium on Photonics and Plasmonics (ISPP-2019)**, Central University of Rajasthan, Ajmer, 23-24 September 2019.
5. **Brijesh Kumar Singh**, Y Eliezer, L. Hareli, A. Bahbad, A Arie "Generation of structured super-oscillatory optical pulses" **International Conference on Fiber Optics and Photonics - Photonics 2018**, Indian Institute of Technology Delhi, India on 12-15 December 2018.
6. **Brijesh Kumar Singh**, "Control transfer of optical energy in the higher order mode of Ince-Gaussian beam" **XLII Annual Meeting of the Optical Society Of India (OSI) International symposium on Optics (OSI-ISO 2018)**, Indian Institute of Technology Kanpur, India on 19-22 September 2018.
7. **Brijesh Kumar Singh**, Harel Nagar, Yael Roichman, and Ady Arie, "Super-oscillations interaction with particle: high localization trapping", **International Topical Meeting on Applied and Adaptive Optics INTOPMAA-17**, Indian Institute of Space, Science and Technology (IIST) Trivandrum, 11-13 August.
8. **Brijesh Kumar Singh**, Harel Nagar, Yael Roichman, and Ady Arie, "High resolution trapping using structured super-oscillating optical beams", **The 6th OASIS International conference and Exhibition on Optics and Electro-optics 2017 Israel**, 27-28 February 2017.
9. **Brijesh Kumar Singh**, Harel Nagar, Yael Roichman, and Ady Arie, "Unprecedented localization of particles using structured super-oscillating optical beams", **Workshop on Light matter interaction**, Tel Aviv University, Israel 26 October, 2016. (**Best Poster Award**).

10. **Brijesh Kumar Singh**, Rakesh Kumar Singh, D. S. Mehta, P. Senthilkumaran, "Polarization Modulation in Speckles", **ICOL 2014**: International conference on optics & optoelectronics 37th Symposium of OSI, IRDE Dehradun, India, March 5-8, 2014.
11. **Brijesh Kumar Singh**, Rakesh Kumar Singh, D. S. Mehta, P. Senthilkumaran, "Polarization Modulation in Speckles", **ICOL 2014**: International conference on optics & optoelectronics 37th Symposium of OSI, IRDE Dehradun, India, March 5-8, 2014.
12. **Brijesh Kumar Singh**, D. S. Mehta and P. Senthilkumaran, "Knife Edge Test of Helico-Conical Beam", In proceedings of XXXVII Optical Society of India (OSI) Symposium on Frontier in Optics and Photonics, Pondicherry University, Pondicherry, India January 23-25, 2013.
13. **Brijesh Kumar Singh**, D. S. Mehta, P. Senthilkumaran, "Generation of Optical Vortices Using Cracked Glass Plate", **Photonics 2012**, In proceedings **IEEE Xplore**, 13583874, (25/06/2013); Electronic ISBN: 978-1-55752-959-0, OSA2012, the International Conference on Fiber Optics and Photonics, IIT Madras, December 9-12, 2012.
14. **Brijesh Kumar Singh**, D. S. Mehta, P. Senthilkumaran, "Study of Poynting Vector and Orbital Angular Momentum of Conical Vortex Lens", **IONS-2** Chennai, IIT Madras, December 7-8, 2012.
15. **Brijesh Kumar Singh**, D. S. Mehta, P. Senthilkumaran, "Experimental Visualization of Optical Energy Flow in a Dipole Vortex Beam", **SO' 2012: "Singular optics"**, Sevastopol, Ukraine, September 16-21, 2012.
16. **Brijesh Kumar Singh**, Manoj Kumar Sharma, Joby Joseph, D. S. Mehta and P. Senthilkumaran, "Generation of Reshaped Hollow Gaussian Beam", The XXXVI Optical Society of India Symposium on Frontier in Optics and Photonics, IIT Delhi, New Delhi, India, December 3-5, 2011. (**Student Organizer**)
17. **Brijesh Kumar Singh**, D. S. Mehta, P. Senthilkumaran, "Experimental Detection of Azimuthal Rotation of Poynting Vector in a Dipole Vortex Beam", International OSA Network of Students **IONS -1, Delhi**, IIT Delhi, New Delhi, India, December 1-2, 2011. (**Student Organizer**)
18. "Hands-on workshop on Biophysical and Biotechnological Research Techniques for Scientists and Scholars", at **AU-KBC Research Center, Anna University** Chennai, July 25-27, 2011.
19. Sunil Vyas, Manoj Kumar Sharma, **Brijesh Kumar Singh**, Joby Joseph, D. S. Mehta, P. Senthilkumaran, "Vortex Creation From Non-Linear Phase Ramps", **Photonics 2010**, International Conference on Fiber Optics and Photonics, IIT Guwahati, December 11-15, 2010.

INVITED TALK IN INTERNATIONAL CONFERENCE

- Deliver invited talk in "International Topical Meeting on Applied and Adaptive Optics INTOPMAA-17", organized by Indian Institute of Space, Science and Technology (IIST) Trivandrum, 11-13 August, 2017
- Physics department seminar, Indian Institute of Technology Ropar, 16 January, 2019
- Physics department, Lucknow University, UP, 18 May, 2020

TEACHING EXPERIENCES

- Assistant Professor, Physics Department, Central University of Rajasthan, Ajmer (Jan 2017- Present)
- Optics and Modern Physics (3 Credit, UG class of 102 Students)
- Atomic Physics (4 Credit, PG class of 38 Students)
- Electromagnetic Theory (4 Credit, PG/UG class of 38 Students)
- Physics Lab I (2 Credit, PG, 38 Students)
- Physics Lab III (2 Credit, UG, 102 Students)
- Physics Lab V (4 Credit, UG, 23 Students)

AFFILIATION TO PROFESSIONAL BODIES

- Member of the Optical Society of India (Life Member)
- Member of the Indian Association of Physics Teachers (2020)
- Member of the OSA- The Optical Society (since 2009 - 2014)
- Member of Israel Physical Society (since 2016-2017)

INTERNATIONAL JOURNALS REVIEWER EXPERIENCES

- Optics Express (Optica/OpticsInfobase Publishers)
- Applied Optics (Optica/OpticsInfobase Publishers)
- Applied Physics Letters (American Institute of Physics)
- Journal of Optics (IOP Publishers)
- Journal of Modern Optics (Taylor & Francis Group)
- Optics and Laser Technology (Elsevier)
- Chinese Optics Letters

PERSONAL PROFILE

NAME	: DR. BRIJESH KUMAR SINGH
Father's Name	: Sri Chandra Prakash Singh
Mother's Name	: Smt. Indu Devi
Date of Birth	: 01 th January 1986
Gender	: Male
Category	: OBC
Marital Status	: Married
Language	: English and Hindi
Nationality	: Indian

REFERENCES OF REFEREES

Prof. P. Senthilkumaran

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DECLARATION

I hereby declare that all the information given by me is true to the best of my knowledge and belief.

Date : 29 October, 2021

Place : Ajmer



(DR. BRIJESH KUMAR SINGH)