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Date of birth: 20th April, 1989

Girish Kulkarni

Research Interests:

Experimental and theoretical quantum optics with a focus on optical coherence, quantum entanglement, spontaneous parametric down-conversion, and foundations of quantum theory.

Employment

2023 - present **Assistant Professor**, *Indian Institute of Technology Ropar*, India

2019 - 2023 **Postdoctoral Fellow**, *University of Ottawa*, Canada,
Mentor: Prof. Robert W. Boyd

Education

2014 - 2019 **PhD in Physics**, *Indian Institute of Technology Kanpur*,
Thesis title: Novel tools for characterizing photon correlations in parametric down-conversion
Thesis supervisor: Prof. Anand K. Jha

2010 - 2013 **M. Sc in Physics**, *Tata Institute of Fundamental Research*, Mumbai

2006 - 2010 **B. Tech in Electrical and Electronics Engineering**,
Visvesvaraya National Institute of Technology, Nagpur

Publications

1. **Experimental generation of polarization entanglement from spontaneous parametric down-conversion of spatiotemporally highly incoherent light**, C. Li, B. Braverman, G. Kulkarni, R. W. Boyd, Phys. Rev. A 107, L041701 (2023)
2. **Classical model of spontaneous parametric down-conversion**, G. Kulkarni, J. Rioux, B. Braverman, M. V. Chekhova, and R. W. Boyd, Phys. Rev. Res. 4, 033098 (2022)
3. **Phase matching in β-barium borate crystals for spontaneous parametric down-conversion**, S. Karan, S. Aarav, H. Bharadhwaj, L. Taneja, A. De, G. Kulkarni, N. Meher, and A. K. Jha, Jour. Opt. 22, 083501 (2020)
4. **Measurement of pure states of light in the orbital-angular-momentum basis using nine multipixel image acquisitions**, G. Kulkarni, S. Karan, and A. K. Jha, Phys. Rev. Applied 13, 054077 (2020)
5. **Intrinsic degree of coherence of two-qubit states and measures of two-particle quantum correlations**, N. Meher, A. S. M. Patoary, G. Kulkarni, A. K. Jha, Journ. Opt. Soc. Am. B 37, 1224 (2020)
6. **Intrinsic degree of coherence of classical and quantum states**, A. S. M. Patoary*, G. Kulkarni*, A. K. Jha, Journ. Opt. Soc. Am. B 36(10), 2765 (2019)(*equal contributors)
7. **Angular Schmidt spectrum of entangled photons: derivation of an exact formula and experimental characterization for non-collinear phase matching**, G. Kulkarni, L. Taneja, S. Aarav, A. K. Jha, Phys. Rev. A 97, 063846 (2018)
8. **Single-shot measurement of the orbital angular momentum spectrum of light**, G. Kulkarni, R. Sahu, O. S. Magana-Loaiza, R. W. Boyd, A. K. Jha, Nature Communications 8 1054 (2017)

9. **Transfer of temporal coherence in parametric downconversion**, G. Kulkarni, P. Kumar, A. K. Jha, J. Opt. Soc. Am. B 34(8), 1637-1643 (2017)
10. **Intrinsic upper bound on two-qubit polarization entanglement predetermined by pump polarization correlations in parametric down-conversion**, G. Kulkarni, V. Subrahmanyam, A. K. Jha, Phys. Rev. A 93, 063842 (2016)

Conferences and Schools

1. **Optica Nonlinear Optics Meeting**, *Honolulu, Hawaii, USA July 9th-13th 2023*
2. **International Conference on Optical Angular Momentum (ICOAM)**, *Tampere, Finland, June 12th-17th 2022*, (Invited speaker)
3. **Frontiers in Optics + Laser Science - 2020**, *(online)*
4. **Conference on Lasers and Electro-Optics (CLEO - 2018, 2022 (online), 2023)**, *San Jose, California, USA*
5. **Frontiers in Light-Matter Interactions - 2014**, *Kolkata, India*
6. **Photonics - 2012**, *Chennai, India*

Teaching Experience

Physics for Engineers Lab, Fall 2023, Spring 2024

Quantum Optics - I, Spring 2024

Other Academic Information

1. Received the best thesis award from Indian Society of Atomic and Molecular Physics (ISAMP) for the year 2020-2021
2. Received the outstanding PhD thesis award and best student paper award from Department of Physics, IIT Kanpur
3. Received international travel grants from Department of Science and Technology (DST), India and Department of Physics, IIT Kanpur for presenting my work at CLEO-2018 held at San Jose, California, USA.
4. Secured All India Ranks of 1 in the CSIR-UGC Nationwide Entrance Test (NET-LS) in Physics, 3 in GATE-2013 in Physics, 19 in JEST-2014 in Physics, and 74 in GATE-2010 in Electrical Engineering.
5. Secured a perfect score of 990/990 in GRE Physics, 331/340 in the general GRE and 109/120 in TOEFL.

Referees

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