Curriculum Vitae

Full Name: Dileep Venkatarama Reddy
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Webpage: https://dileepvr.github.io
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Title: Postdoctoral Research Associate, National Institute for Standards and Technology
NIST/PREP program, Department of Physics, University of Colorado Boulder
Past Titles: Postdoctoral Research Scholar, Department of Physics, University of Oregon, 2017-2018

Education

Doctor of Philosophy, **Physics**, University of Oregon, 2017
Master of Technology, **Communications and Signal Processing** Indian Institute of Technology, Madras, 2009
Bachelor of Technology, **Electrical Engineering** with minor in Physics, Indian Institute of Technology, Madras

Academic Distinctions

- Won the Weiser PhD Thesis award (2017-18), Department of Physics, University of Oregon.
- Awarded the Science Literacy Program (SLP) fellowship for spring term 2014, and fall term 2013, University of Oregon.
- Awarded the Weiser Senior Teaching Assistant award (2012-13) and the Weiser General Physics Graduate Teaching Assistant Award (2010-11) by the Department of Physics, University of Oregon.
- Secured an All India Rank of 550 (top 0.15%) in the Joint Entrance Examination (IIT-JEE) conducted by the Indian Institute of Technology in the year 2004.
- Secured an All India Rank of 2896 and a State Rank of 67 in the general test, an All India Rank of 36 and a State Rank of 1 in Architecture, and an All India Rank of 722 and a State Rank of 5 in the Pharmacy section in the All Indian Engineering Entrance Examination (AIEEE), 2004. (State: Karnataka)
- Selected (among 120 nationwide) for the annual Summer Research Fellowship Program (SRFP) initiated by the Jawaharlal Nehru Institute of Advanced Scientific Research (JNCASR, Bangalore) in 2006, in the area of Physical Sciences.

- Secured a Rank of 349 in the 5th National Science Olympiad, India, held in 2003.

- Scored 94.5% in basic Science subjects in the All India Senior Secondary School Certificate Examination 2004.

Publications

1. **"Widely tunable integrated GaAs and AlGaAs platforms for efficient second-order frequency conversion,"** E. Ulsig, M. Madsen, E. J. Stanton, Dileep V. Reddy, A. Leger, S. Sorensen, I. Degli-Eredi, M. Stevens, D. Hamel, L. Shalm, R. P. Mirin, and N. Volet, Opt. Open 112364 (2024).

2. **"Coherent control of an optical quantum dot using phonons and photons,"** R. A. DeCrescent, Z. Wang, J. T. Bush, P. Imany, A. Kwiatkowski, Dileep V. Reddy, S. W. Nam, R. P. Mirin, and K. L. Silverman arXiv:2404.02079 (2024).

3. **"Metropolitan-scale entanglement distribution with co-existing quantum and classical signals in a single fiber,"** A. Rahmouni, P. S. Kuo, Y. S. Li-Baboud, I. A. Burenkov, Y. Shi, M. V. Jabir, N. Lal, Dileep V. Reddy, M. Merzouki, L. Ma, A. Battou, S. V. Polyakov, O. Slatery, and T. Gerritts, arXiv:2402.00617 (2024).

4. **"Gated InAs quantum dots embedded insurface acoustic wave cavities for low-noise optomechanics,"** Z. Wang, R. A. DeCrescent, P. Imany, J. T. Bush, Dileep V. Reddy, S. W. Nam, R. P. Mirin, and K. L. Silverman, arXiv:2312.10215 (2023).

5. **"Photon-pair production and frequency translation using backward-wave spontaneous parametric downconversion,"** P. S. Kuo, Dileep V. Reddy, V. B. Verma, S. W. Nam, A. Zukauskas, and C. Canalias, Optica Quantum **1,** 43–48 (2023).

6. **"Development of superconducting single-photon and photon-number resolving detectors for quantum applications,"** A. E. Lita, Dileep V. Reddy, V. B. Verma, R. P. Mirin, and S. W. Nam, J. Lightwave Technol. `https://doi.org/10.1109/JLT.2022.3195000` (2022).

7. **"Broadband polarization insensitivity and high detection efficiency in high-fill-factor superconducting microwire single-photon detectors,"** Dileep V. Reddy, N. Otrooshi, Sae Woo Nam, R. P. Mirin, and V. B. Verma, APL Photonics **7,** 051302 (2022).

8. **"Superconducting nanowire single-photon detectors with 98% system detection efficiency at 1550 nm,"** Dileep V. Reddy, R. R. Nerem, Sae Woo Nam, R. P. Mirin, and V. B. Verma, Optica **7,** 1649–1653 (2020).

9. **"Photonic temporal-mode multiplexing by quantum frequency conversion in a dichroic-finesse cavity,"** Dileep V. Reddy and M. G. Raymer, Opt. Express **26,** 28091–28103 (2018).

10. **"Time reversal of arbitrary photonic temporal modes via nonlinear optical frequency conversion,"** M. G. Raymer, Dileep V. Reddy, S. J. van Enk, and C. J. McKinstrie, New J. Phys. **20,** 053027 (2018).

11. **"High-selectivity quantum pulse gating of photonic temporal modes using all-optical Ramsey interferometry,"** Dileep V. Reddy and M. G. Raymer, Optica **5,** 423–428 (2018).

12. **"Theory of noise suppression in Λ-type quantum memories by means of a cavity,"** J. Nunn, J. H. D. Munns, S. Thomas, K. T. Kaczmarek, C. Qiu, A. Feizpour, E. Poem, B. Brecht, D. J. Saunders, P. M. Ledingham, Dileep V. Reddy, M. G. Raymer, and I. A. Walmsley, Phys. Rev. A **96,** 012338 (2017).

13. **"Engineering temporal-mode-selective frequency conversion in nonlinear optical waveguides: From theory to experiment,"** Dileep V. Reddy and M. G. Raymer, Opt. Express **25,** 12952 (2017).

14. **"Observation of interaction of spin and intrinsic orbital angular momentum of light,"** D. L. P. Vitullo, C. C. Leary, P. Gregg, R. A. Smith, Dileep V. Reddy, S. Ramachandran, and M. G. Raymer, Phys. Rev. Lett. **118,** 083601 (2017).

15. **"Double-heralded generation of two-photon-states by spontaneous four-wave-mixing in the presence of noise,"** R. A. Smith, Dileep V. Reddy, D. L. P. Vitullo, and M. G. Raymer, Opt. Express **24,** 5809 (2016).

16. **"Photon temporal modes: A complete framework for quantum information science,"** B. Brecht, Dileep V. Reddy, C. Silberhorn, and M. G. Raymer, Phys. Rev. X **5,** 041017 (2015).

17. **"Temporal mode sorting using dual-stage quantum frequency conversion by asymmetric Bragg scattering,"** J. B. Christensen, Dileep V. Reddy, C. J. McKinstrie, K. Rottwitt, and M. G. Raymer, Opt. Express **23,** 23287 (2015).

18. **"Sorting photon wave packets using temporal-mode interferometry based on multiple-stage quantum frequency conversion,"** D. V. Reddy, M. G. Raymer, and C. J. McKinstrie, Phys. Rev. A **91,** 012323 (2015).

19. **"Efficient sorting of quantum-optical wave packets by temporal-mode interferometry,"** D. V. Reddy, M. G. Raymer, and C. J. McKinstrie, Opt. Lett. **39,** 2924 (2014).

20. **"Temporal mode selectivity by frequency conversion in second-order nonlinear optical waveguides,"** D. V. Reddy, M. G. Raymer, C. J. McKinstrie, L. Mejling, and K. Rottwitt, Opt. Express **21,** 13840 (2013).

Patents

- Dileep V. Reddy and Michael G. Raymer, "TEMPORAL MODES OF ELECTROMAGNETIC RADIATION USING NONLINEAR OPTICAL CAVITIES AND SHAPED LASER PULSES"
  U.S. Patent No. 10,871,699 B2, Issued: December 22, 2020

- Dylan Saunders et al., "DE-MULTIPLEXER AND METHOD OF SEPARATING MODES OF ELECTROMAGNETIC RADIATION"
  U.S. Patent No. 11,038,618, Issued: June 15, 2021
  United Kingdom Patent Application No. 1800566.0, filed on January 12, 2018

Conference Presentations

1. **"High-efficiency, superconducting nanowire single-photon detectors from ultraviolet to infrared,"** R. P. Mirin, B. Hampel, A. E. Lita, A. McCaughan, B. Oripov, Dileep V. Reddy, M. J. Stevens, V. B. Verma, and S. W. Nam, IEEE Photon. Conf. (IPC 2023).

2. **"Single-photon downconversion in GaAs, AlGaAs and InGaP-on-insulator,"** E. Z. Ulsig, M. L. Madsen, E. J. Stanton, Dileep V. Reddy, I. Degli-Eredi, R. P. Mirin, and N. Volet, IEEE Photon. Conf. (IPC 2023).

3. **"Correlated Photon Pairs Obtained by SPDC in AlGaAs-OI Waveguides,"** Emil Ulsig, Eric Stanton, Dileep V. Reddy, K. Lynden Shalm, Nicolas Volet, and Richard P. Mirin, Quantum 2.0 QTh4C.2 (Quantum 2.0 2023).

4. **"Frequency translation using backward-wave spontaneous parametric downconversion,"** P. S. Kuo, Dileep V. Reddy, V. B. Verma, S. W. Nam, A. Zukauskas, and C. Canalias, SW4G.5 (CLEO 2023).

5. **"Observation of backward-wave spontaneous parametric downconversion in sub-μ m PPKTP,"** P. S. Kuo, Dileep V. Reddy, V. B. Verma, S. W. Nam, A. Zukauskas, and C. Canalias, FM5B.7 (FiO 2022).

6. **"Candelabra-style meanders in superconducting microwires for broadband polarization insensitivity in highly-efficient single-photon detectors,"** Dileep V. Reddy, Negar Otrooshi, Richard P. Mirin, Sae Woo Nam, and Varun B. Verma, 2EOr2D-02 (ASC 2022).

7. **"Alignment of optical fiber array to a small 1D-array of optical transition edge sensors,"** Negar Otrooshi, Adriana E. Lita, Robert Boutelle, Nima Nader, Bakhrom Oripov, Dileep V. Reddy, Ruslan Hummatov, Tannaz Farrahi, Richard P. Mirin, and Sae Woo Nam, 5EOr2B-04 (ASC 2022).

8. **"Polarization independence in superconducting microwire single-photon detectors,"** Dileep V. Reddy, Negar Otrooshi, Sae Woo Nam, Richard P. Mirin, and Varun B. Verma, SM3K.2 (CLEO

2022).

9. **"Achieving 98% system efficiency at 1550 nm in superconducting nanowire single photon detectors,"** Dileep V. Reddy, Adriana E. Lita, Sae Woo Nam, Richard P. Mirin, and Varun B. Verma, W2B (CQO-11 2019).

10. **"Exceeding 95% system efficiency within the telecom C-band in superconducting nanowire single photon detectors,"** Dileep V. Reddy, Robert R. Nerem, Adriana E. Lita, Sae Woo Nam, Richard P. Mirin, and Varun B. Verma, FF1A.3 (CLEO 2019).

11. **"High-Efficiency Multiplexing of Quantum Information in Optical Temporal Modes,"** Michael G. Raymer and Dileep V. Reddy, FW6D.3 (FiO 2018).

12. **"On quantum pulse gating and the temporal-mode basis,"** Dileep V. Reddy and Michael G. Raymer, (CQIQC-VII 2017).

13. **"Observation of intrinsic spin-orbit interaction of light in few-mode optical fiber,"** Dashiell L. P. Vitullo, Cody C. Leary, Patrick Gregg, Roger A. Smith, Dileep V. Reddy, Siddharth Ramachandran, and Michael G. Raymer, FW2B.4 (FiO 2016).

14. **"Noise characterization in double-heralded generation of two-photon-states by spontaneous four-wave-mixing,"** Roger A. Smith, Dileep V. Reddy, Dashiell L. P. Vitullo, and Michael G. Raymer, 99800N (QCQI XIV, 2016).

15. **"Theory of loss in a distributed feedback cavity-enhanced single-photon SPDC source,"** Michael G. Raymer and Dileep V. Reddy, LF2E.4 (FiO 2016).

16. **"Verification of a heralded, two-photon Fock state with a gang of detectors,"** Roger A. Smith, Dileep V. Reddy, Dashiell L. P. Vitullo, and Michael G. Raymer, FTu3G.2 (FiO 2015).

17. **"Photon temporal modes as a complete framework for quantum information,"** Michael G. Raymer, Benjamin Brecht, Dileep V. Reddy, and Christine Silberhorn, FW3D.2 (FiO 2015).

18. **"Quantum information science with temporal modes,"** Benjamin Brecht, Dileep V. Reddy, Christine Silberhorn, and Michael G. Raymer, EB-2a-2 (CLEO 2015).

19. **"Efficient sorting of single-photon wave packets by temporal-mode interferometry,"** Dileep V. Reddy, Michael G. Raymer, and Colin J. McKinstrie, FTu4A.5 (FiO 2014).

20. **"Asymmetrically pumped Bragg scattering with effects of nonlinear phase modulation,"** Lasse Mejling, Soren M. M. Friis, Dileep V. Reddy, Karsten Rottwitt, Michael G. Raymer, and Colin J. McKinstrie, JTu3A (Optical Sensors, 2014).

21. **"Mode selectivity with quantum-state-preserving frequency conversion using four-wave mixing,"** Lasse Mejling, Dileep V. Reddy, Colin J. McKinstrie, Michael G. Raymer, and Karsten

Rottwitt, Photonic Society Summer Topical Meeting Series (IEEE 2013).

22. **"Quantum-state-preserving Frequency Conversion Using Four-wave Mixing,"** Lasse Mejling Andersen, Dileep V. Reddy, Colin J. McKinstrie, Michael G. Raymer, and Karsten Rottwitt, NTu1A.2 (NLO 2013).

23. **"Quantum frequency conversion of single-photon states by three and four-wave mixing,"** Michael G. Raymer, Dileep V. Reddy, Lesse Mejling, and Karsten Rottwitt, CM4D.1 (CLEO, 2013).

Doctoral Thesis

Temporal-mode interferometry: A technique for highly selective quantum pulse gating via cascaded frequency conversion in nonlinear optical waveguides.
Date of Submission: September 16^{th}, 2017
Advisor: Prof. Michael G. Raymer
Institution: Department of Department of Physics, University of Oregon

Masters Thesis

2-D analysis of the difference in alternating current distributions between low-permeability and high-permeability conductors with irregular cross-sections.
Date of Submission: May 16^{th}, 2009
Advisor: Prof. Harishankar Ramachandran
Institution: Department of Electrical Engineering, Indian Institute of Technology, Madras