

Dileep V. Reddy

Postdoctoral Research Associate, National Institute for Standards and Technology
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Past Positions:

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 Wieser 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.

Publications:

1. **“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).
2. **“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, accepted by *New J. Phys.* **20**, 053027 (2018).
3. **“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).
4. **“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).
5. **“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).
6. **“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).
7. **“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).
8. **“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).

9. **“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).
10. **“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).
11. **“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).
12. **“Temporal mode selectivity by frequency conversion in second-order nonlinear optical waveguides,”** D. V. Reddy, M. G. Raymer, C. J. McKinstrie, L. Mejlum, and K. Rottwitt, *Opt. Express* **21**, 13840 (2013).

Patents:

1. Dileep V. Reddy and Michael G. Raymer, **“TEMPORAL MODES OF ELECTROMAGNETIC RADIATION USING NONLINEAR OPTICAL CAVITIES AND SHAPED LASER PULSES”**
U.S. Patent Application No. 16/530,737, filed on August 2, 2019
2. Dylan Saunders et al., **“DE-MULTIPLEXER AND METHOD OF SEPARATING MODES OF ELECTROMAGNETIC RADIATION”**
U.S. Provisional Patent Application No. 62/597,231, filed on December 11, 2017
United Kingdom Patent Application No. 1800566.0, filed on January 12, 2018

Conference Presentations:

1. **“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).
2. **“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).
3. **“High-Efficiency Multiplexing of Quantum Information in Optical Temporal Modes,”** Michael G. Raymer and Dileep V. Reddy, FW6D.3 (FiO 2018).
4. **“On quantum pulse gating and the temporal-mode basis,”** Dileep V. Reddy and Michael G. Raymer, (CQIQCVII 2017).
5. **“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).
6. **“Theory of loss in a distributed feedback cavity-enhanced single-photon SPDC source,”** Michael G. Raymer and Dileep V. Reddy, LF2E.4 (FiO 2016).
7. **“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).
8. **“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).
9. **“Quantum information science with temporal modes,”** Benjamin Brecht, Dileep V. Reddy, Christine Silberhorn, and Michael G. Raymer, EB_2a.2 (CLEO 2015).
10. **“Efficient sorting of single-photon wave packets by temporal-mode interferometry,”** D. V. Reddy, M. G. Raymer, and C. J. McKinstrie, FTu4A.5 (FiO 2014).

11. **“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).
12. **“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).

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 16th, 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 16th, 2009

Advisor: Prof. Harishankar Ramachandran

Institution: Department of Electrical Engineering, Indian Institute of Technology, Madras

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