Dileep V. Reddy

dileep@uoregon.edu

Education:

Doctorate (Pursuing), Physics, University of Oregon
Master of Technology, Indian Institute of Technology, Madras, 2009
Bachelor of Technology, Indian Institute of Technology, Madras

Undergraduate Major: Electrical Engineering
Undergraduate Minor: Physics
Masters Specialization: Communications and Signal Processing

Academic Distinctions:

- 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 (Grade 12).

Publications:

1. **"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).
2. **"Temporal mode sorting using dial-stage quantum frequency conversion by asymmetric Bragg scattering,"** Jesper B. Christensen, Dileep V. Reddy, C. J. McKinstrie, K. Rottwitt, and M. G. Raymer, Opt. Express **23**, 23287 (2015).
3. **"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).
4. **"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).
5. **"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. Exp. **21**, 13840 (2013).

Conference Presentations:

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

3. **"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).

4. **"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).

5. **"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).

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
Guide: Prof. Harishankar Ramachandran
Work Place: Department of Electrical Engineering, Indian Institute of Technology, Madras

Undergraduate Research Experience:

1. **Exploration of Free Energy Barriers to structural relaxation using Forward Flux Sampling, and Umbrella Sampling Techniques.**
   Status: Paper in preparation
   Date: Summer, 2008
   Guide: Prof. Srikanth Sastry
   Venue: Jawaharlal Nehru Center for Advanced Scientific Research (JNCASR), Bangalore
   The Project entailed Monte Carlo simulation of the glass-forming liquid at various temperatures, and the use of Forward Flux Sampling and Umbrella Sampling to explore free energy barriers to structural relaxation.

2. **Design and Construction of a Capacitive Discharge based Table-top Electromagnetic Mass-Accelerator.**
   Status: Ongoing
   Date: Summer, 2007
   Guide: Prof. K. P. J. Reddy
   Venue: Indian Institute of Science (IISc), Bangalore
   The Project entailed use of Finite-Element Methods to numerically simulate discharge characteristics, current distributions and force dynamics of the device, as well as design and physical construction of synchronous high-power transistor switches to be used to trigger rapid discharge of capacitor banks.

3. **Estimation of Free Energy Barrier for Crystal Nucleation in a Supercooled liquid drop via Monte Carlo Simulations and Umbrella Sampling Technique.**
   Date: Summer, 2006
   Guide: Prof. Srikanth Sastry
   Venue: Jawaharlal Nehru Center for Advanced Scientific Research (JNCASR), Bangalore
   The Project entailed Monte Carlo Simulations of crystallization of a metastable liquid of particles interacting via the Lennard-Jones potential. An orientational order parameter based on spherical harmonics was used to define the order parameter quantifying the degree of of crystallization. This reaction coordinate was used in Umbrella Sampling to determine the free-energy barrier to crystallization. Radial location of the critical nucleus was recorded.

4. **Experimental Determination of Energy and Sugar conservation efficiency in Fermentation of Sugarcane Extract into Ethanol.**
   Date: Summer, 2003
   Guide: Dr. H. N. Chanakya
   Venue: Indian Institute of Science (IISc), Bangalore
   The Project entailed yeast-aided fermentation of pure Sugarcane extract into dilute Ethanol, followed by estimation of conservation ratio of saccharides (sugars) at different stages of the fermenting period using Nelson-Somogyi method of sugar concentration determination.

5. **Experimental Study of Stomatal Structure and Activity with respect to Time of day for Various Flora.**
   Date: Summer, 2000
   Guide: Dr. H. N. Chanakya
   Venue: Indian Institute of Science (IISc), Bangalore
   The Project entailed use of a semi-solid gel of polystyrene dissolved in Xylene solvent to create transparent moulds of stomata and other micrometer structures on lower leaf surfaces, and their observation under optical microscope. Surface number density and active/closed state of Stomata were identified. These parameters were recorded for various species of Flora at different times of the day.

Skills and Interests:

Physics:-
Quantum Optics, Field Theories (CFT, QFT), Quantum Information, Statistical Thermodynamics.

Mathematics:-
Differential Geometry, Group Theory, Calculus of Variations, Probability and Statistics.