

QUANTUM ENGINEERING AND COMPUTING PUBLICATIONS

2018

L. Ranzani, M. Bal, K.C. Fong, G. Ribeill, X. Wu, J. Long, H-S. Ku, R. P. Erickson, D. Pappas, and T. A. Ohki. "Kinetic inductance traveling-wave amplifiers for multiplexed qubit readout," *Applied Physics Letters* 113 (24), 242602 (2018).

R. McDermott, M. G. Vavilov, B. L. T. Plourde, F. K. Wilhelm, P. J. Liebermann, O. A. Mukhanov, T. A. Ohki "Quantum-Classical Interface Based on Single Flux Quantum Digital Logic" *Quantum Science and Technology* , 3 (2), 024004 (2018)

F. De Leonardis, R. A Soref, M. Soltani, V. MN Passaro, "Stimulated Brillouin Scattering in an AlGaIn Photonics Platform Operating in the Visible Spectral Range," *Nature Scientific reports* 8 (1), 14849 (2018).

T. J. Lu, M. Fanto, H. Choi, P. Thomas, J. Steidle, S. Mouradian, W. Kong, D. Zhu, H. Moon, K. Berggren, J. Kim, M. Soltani, S. Preble, D. Englund, "Aluminum nitride integrated photonics platform for the ultraviolet to visible spectrum," *Optics Express* 26 (9), 11147-11160, 2018.

D. A. Laleyan, X. Liu, A. Pandey, W. Jin, Shin, E. T. Reid, K. Mashooq, M. Soltani, Z. Mi, "Molecular beam epitaxy and characterization of Al_{0.6}Ga_{0.4}N epilayers," *J. Crystal Growth* 507, 87-92 (2018).

D. K. Efetov, R.-J. Shiue, Y. Gao, B. Skinner, E. Walsh, H. Choi, J. Zheng, C. Tan, G. Grosso, C. Peng, J. Hone, K. C. Fong, and D. Englund, "Fast thermal relaxation in cavity-coupled graphene bolometers with a Johnson noise read-out," *Nat. Nanotechnol.* 13, 797 (2018).

Chui-Zhen Chen, James Jun He, Mazhar Ali, Gil-ho Lee, K.C. Fong, and K. T. Law, "Asymmetric Josephson Effect in Inversion Symmetry Breaking Topological Materials," *Phys. Rev. B* 98, 075430 (2018).

A. Lucas and K. C. Fong, "Hydrodynamics of electrons in graphene," *J. Phys.: Condens. Matter* 30, 053001 (Jan. 2018).

Xiao-Ming, Hari Krovi, Ranjith Nair, Saikat Guha and Jeffrey H. Shapiro, *Nature Quantum Information*, Volume 4, Article 64 (2018), pages 1-8.

2017

M. Pant, H. Krovi, D. Englund, and S. Guha, "Rate-distance tradeoff and resource costs for all-optical quantum repeaters," *Phys. Rev. A* 95, 012304 – Published 4 January 2017 (Jan. 04, 2017).

2016

Pinna D., Ryan C. A., Ohki T., Kent A. D., "Reliable spin-transfer torque driven precessional magnetization reversal with an adiabatically decaying pulse," *Phys. Rev. B* 93, 184412 (May. 12, 2016).

J. Crossno, J. K. Shi, K. Wang, X. Liu, A. Harzheim, A. Lucas, S. Sachdev, P. Kim, T. Taniguchi, K. Watanabe, T. A. Ohki, K. C. Fong, "Observation of the Dirac fluid and the breakdown of the Wiedemann-Franz law in graphene," *Science* 351, 1058 (Mar. 04, 2016).

A. Lucas, J. Crossno, K. C. Fong, P. Kim, and S. Sachdev, "Transport in inhomogeneous quantum critical fluids and in the Dirac fluid in graphene," *Phys. Rev. B* 93, 075426 (Feb. 16, 2016).

P. Bhupathi, Peter Groszkowski, M.P. DeFeo, Matthew Ware, Frank K. Wilhelm, B.L.T. Plourde, "Transient dynamics of a superconducting nonlinear oscillator," *Physical Review Applied* 5, 024002 (Feb. 01, 2016).

D. Goeckel, B. A. Bash, S. Guha, D. Towsley, "Covert Communications When the Warden Does Not Know the Background Noise Power," *IEEE Communications Letters*, 20 (2), pp. 236-239 (Feb. 01, 2016).

B. A. Bash, D. Goeckel, D. Towsley, "Covert Communication Gains from Adversary's Ignorance of Transmission Time," *IEEE Transactions on Wireless Communications*, 15 (12), pp. 8394-8405 (Dec. 01, 2016).

M. Soltani, R. Soref, T. Palacios, and D. Englund, "AlGaIn/AlN integrated photonics platform for the ultraviolet and visible spectral range," *Opt. Express* 24, 25415-25423 (Oct. 31, 2016).

Stephen Wein, Khabat Heshami, Christopher A. Fuchs, Hari Krovi, Zachary Dutton, Wolfgang Tittel, and Christoph Simon, "Efficiency of an enhanced linear optical Bell-state measurement scheme with realistic imperfections," *Physical Review A* 94 032332 (Sep. 29, 2016).

M. Soltani, V. Ilchenko, A. Matsko, A. Savchenkov, J. Schlafer, C. Ryan, and L. Maleki, "Ultrahigh Q whispering gallery mode electro-optic resonators on a silicon photonic chip," *Optics Letters* 41, 4375-4378 (Sep. 15, 2016).

H. W. Chung, S. Guha, and L. Zheng, "Superadditivity of Quantum Channel Coding Rate with Finite Blocklength

2016

Quantum Measurements," IEEE Transactions on Information Theory (Jul. 31, 2016).

H. Krovi, S. Guha, Z. Dutton, J. A. Slater, C. Simon, and W. Tittel, "Practical quantum repeaters with parametric down-conversion sources," Applied Physics B: Lasers and Optics, topical collection on Quantum Repeaters: From Components to Strategies, 122 3, (1-8 March 2016)

S. Guha, D. Towsley, C. Capar, A. Swami, and P. Basu, "Spanning connectivity in a multilayer network and its relationship to site-bond percolation," Physical Review E 93, 032310 (2016).

H. W. Chung, S. Guha, and L. Zheng, "Superadditivity of Quantum Channel Coding Rate with Finite Blocklength Quantum Measurements," to appear in IEEE Transactions on Information Theory, DOI:10.1109/TIT.2016.2597285 (2016).

M. Soltani, V. Ilchenko, A. Matsko, A. Savchenkov, J. Schlafer, C. Ryan, and L. Maleki, "Ultrahigh Q whispering gallery mode electro-optic resonators on a silicon photonic chip," Opt. Lett. 41, 4375-4378 (2016).

S. Wein, K. Heshami, C. A. Fuchs, H. Krovi, Z. Dutton, W. Tittel, and C. Simon, "Efficiency of an enhanced linear optical Bell-state measurement scheme with realistic imperfections," American Physical Society Phys. Rev. A 94, 032332 (September 29, 2016).

2015

Hari Krovi, Saikat Guha, Zachary Dutton, Marcus P. da Silva, "Optimal measurements for symmetric quantum states with applications to optical communication," Physical Review A 92, 062333 (Dec. 21, 2015).

Mohammad Soltani, Andrei Matsko & Lute Maleki, "Enabling arbitrary wavelength frequency combs," Laser & Photonics Reviews (Dec. 17, 2015).

B. A. Bash, D. Goeckel, D. Towsley, S. Guha, "Hiding information in noise: fundamental limits of covert wireless communication," IEEE Communications Magazine, 53 (12), pp. 26-31 (Dec. 01, 2015).

Blake R Johnson, Marcus P da Silva, Colm A Ryan, Shelby Kimmel, Jerry M Chow and Thomas A Ohki, "Demonstration of robust quantum gate tomography via randomized benchmarking," New Journal of Physics 17, 113019 (Nov. 05, 2015).

B. A. Bash, A. H. Gheorghie, M. Patel, J. L. Habif, D. Goeckel, D. Towsley, and S. Guha, "Quantum-secure covert communication on bosonic channels," Nature Communications, 6, 8626 (Oct. 19, 2015).

Mohammad Soltani & Richard Soref, "Free-carrier electrorefraction and electroabsorption in wurtzite GaN," Optics Express (Sep. 21, 2015).

Saikat Guha, Hari Krovi, Christopher A. Fuchs, Zachary Dutton, Joshua A. Slater, Christoph Simon, Wolfgang Tittel, "Rate-loss analysis of an efficient quantum repeater architecture," Physical Review A 92, 022357 (Aug. 31, 2015).

A. F. Kirichenko, I. V. Vernik, O. A. Mukhanov and T. A. Ohki, "ERSFQ 4-to-16 Decoder for Energy-Efficient RAM," IEEE Trans. Appl. Supercond. (Jun. 01, 2015).

Hari Krovi, Alexander Russell, "Quantum Fourier Transforms and the Complexity of Link Invariants for Quantum Doubles of Finite Groups," Communications in Mathematical Physics (Mar. 16, 2015).

Hari Krovi, Frédéric Magniez, M. Ozols, J. Roland, "Quantum walks can find a marked element on any graph," Algorithmica, pages 1-57, 3 March 2015 (Mar. 03, 2015).

2015

Shabir Barzanjeh, Saikat Guha, Christian Weedbrook, David Vitali, Jeffrey H. Shapiro, Stefano Pirandola, "Microwave quantum illumination," *Physical Review Letters* 114, 080503 (Feb. 27, 2015).

Colm A. Ryan, Blake R. Johnson, Jay M. Gambetta, Jerry M. Chow, Marcus P. da Silva, Oliver E. Dial, Thomas A. Ohki, "Tomography via Correlation of Noisy Measurement Records," *Phys. Rev. A* 91, 022118 (Feb. 20, 2015).

Jesse Crossno, Xiaomeng Liu, Thomas A. Ohki, Philip Kim, Kin chung Fong, "Development of high frequency and wide bandwidth Johnson noise thermometry," *Appl. Phys. Lett.* 106, 023121 (2015 (Jan. 08, 2015)).

2014

D. M. Appleby, Christopher A. Fuchs, Huangjun Zhu, "Group Theoretic, Lie Algebraic and Jordan Algebraic Formulations of the SIC Existence Problem," *Quantum Information and Computation* 15, 61–94 (Dec. 31, 2014).

Christopher A. Fuchs, Ruediger Schack, "QBism and the Greeks: Why a Quantum State Does Not Represent an Element of Physical Reality," *Physica Scripta* 89 (Dec. 30, 2014).

R. Namiki, O. Gittsovich, S. Guha, and N. Lutkenhaus, "Gaussian-only regenerative stations cannot act as quantum repeaters," *Physical Review A*, 90, 062316 (Dec. 08, 2014).

Marcus P. da Silva, Saikat Guha and Zachary Dutton, "Optimal discrimination of M coherent states with a small quantum computer," *AIP Conf. Proc.* 1633, 225 (2014) (Dec. 04, 2014).

M. Takeoka, S. Guha, and M. M. Wilde, "Fundamental rate-loss tradeoff for optical quantum key distribution," *Nature Communications*, 5, 5235 (Oct. 24, 2014).

Hon Wai Lau, Zachary Dutton, Tian Wang, Christoph Simon, "Proposal for the Creation and Optical Detection of Spin Cat States in Bose-Einstein Condensates," *Physical Review Letters* 113, 090401 (Aug. 29, 2014).

Christopher A. Fuchs, N. David Mermin, Ruediger Schack, "An Introduction to QBism with an Application to the Locality of Quantum Mechanics," *American Journal of Physics* 82, 749–754 (Aug. 01, 2014).

M. Takeoka, S. Guha, and M. M. Wilde, "The squashed entanglement of a quantum channel," *IEEE Transactions on Information Theory*, Vol. 60, No. 8 (Aug. 01, 2014).

Daniela F. Bogorin, D. T. McClure, Matthew Ware, B. L. T. Plourde, "Copper waveguide cavities with reduced surface loss for coupling to superconducting qubits," *IEEE Transactions on Applied Superconductivity* vol. 24, no. 4, pp. 1-7, Aug. 2014 (Jun. 30, 2014).

Jerry M. Chow, Jay M. Gambetta, Easwar Magesan, David W. Abraham, Andrew W. Cross, B R Johnson, Nicholas A. Masluk, Colm A. Ryan, John A. Smolin, Srikanth J. Srinivasan, and M Steffen, "Implementing a strand of a scalable fault-tolerant quantum computing fabric," *Nature Communications* 5, 4015 (Jun. 24, 2014).

M. Takeoka and S. Guha, "Capacity of optical communication in loss and noise with general Gaussian receivers," *Physical Review A*, 89, 042309 (Apr. 10, 2014).

Shelby Kimmel, Marcus P. da Silva, Colm A. Ryan, Blake R. Johnson, and Thomas Ohki, "Robust Extraction of Tomographic Information via Randomized Benchmarking," *Phys. Rev. X* 4, 011050 (Mar. 25, 2014).

R. Nair, S. Guha and S.-H. Tan, "Realizable receivers for discriminating arbitrary coherent-state waveforms and multi-copy

2014

quantum states near the quantum limit," *Physical Review A*, 89, 032318 (Mar. 12, 2014).

L. Ye, D. B. Gopman, L. Rehm, D. Backes, G. Wolf, T. Ohki, A. F. Kirichenko, I. V. Vernik, O. A. Mukhanov and A. D. Kent, "Spin-transfer switching of orthogonal spin-valve devices at cryogenic temperatures," *J. Appl. Phys.* 115, 17C725 (Mar. 02, 2014).

D. M. Appleby, Christopher A. Fuchs, Hoan Bui Dang, "Symmetric Informationally-Complete Quantum States as Analogues to Orthonormal Bases and Minimum-Uncertainty States," *Entropy* 16, 1484–1492 (Mar. 01, 2014).

S. Guha, P. Hayden, H. Krovi, S. Lloyd, C. Lupo, J. H. Shapiro, M. Takeoka, M. M. Wilde, "Quantum enigma machines and the locking capacity of a quantum channel," *Physical Review X*, 4, 011016 (Jan. 31, 2014).

2013

S. Guha and J. H. Shapiro, "Reading boundless error-free bits using a single photon," *Phys. Rev. A*, 87 (Dec. 01, 2013).

Andrei Lapets, Marcus P da Silva, Mike Thome, Aaron Adler, Jacob Beal, Martin Rötteler, "QuaFL: a typed DSL for quantum programming," *Proceedings of the 1st Annual Workshop on Functional Programming Concepts in Domain-Specific Languages* (Sep. 22, 2013).

B. Bash, S. Guha, D. Goeckel, D. Towsley, "Quantum Noise Limited Optical Communication with Low Probability of Detection," *Information Theory Proceedings (ISIT), 2013 IEEE International Symposium*, pgs. 1715-1719 (Jul. 10, 2013).

M. Takeoka, H. Krovi, S. Guha, "Achieving the Holevo Capacity of a Pure State Classical-Quantum Channel via Unambiguous State Discrimination," *Information Theory Proceedings (ISIT), 2013 IEEE International Symposium*, pgs. 166-170 (Jul. 08, 2013).

R. Nair, S. Guha, S.-H. Tan, "A Realizable Receiver for discriminating arbitrary Coherent States near the Quantum Limit," *Information Theory Proceedings (ISIT), 2013 IEEE International Symposium*, pgs. 729-733 (Jul. 08, 2013).

J. D. Strand, Matthew Ware, Félix Beaudoin, Thomas A. Ohki, B. R. Johnson, Alexandre Blais, B. L. T. Plourde, "First-order sideband transitions with flux-driven asymmetric transmon qubits," *Physical Review B* 87, 220505(R) (Jul. 06, 2013).

M. M. Wilde and S. Guha, "Polar codes for degradable quantum channels," *IEEE Transactions on Information Theory*, vol. 59, no.7, pages 4718-4729 (Jul. 01, 2013).

Shahrokhshahi, Reihaneh; Sridhar, Niranjana; Pfister, Olivier; Habif, Jonathan L; Guha, Saikat; Miller, Aaron; Nam, Sae Woo; Lita, Adriana E; Calkins, Brice; Gerrits, Thomas; Lamas-Linares, Antia, "High Photon Information Efficient Imaging Using Single Photon Source," *Proceedings of the Conference on Lasers and Electro-Optics* (Jun. 09, 2013).

Jonathan L. Habif, Saikat Guha and Zachary Dutton, "Polar Coded Optical Communications with Weak Coherent States," *Proceedings of the Conference on Lasers and Electro-Optics* (Jun. 09, 2013).

Seth T. Merkel, Jay M. Gambetta, John A. Smolin, Stefano Poletto, Antonio D. Córcoles, Blake R. Johnson, Colm A. Ryan, and Matthias Steffen, "Self-consistent quantum process tomography," *Phys. Rev. A* 87, 062119 (Jun. 01, 2013).

Marcus P. da Silva, S. Guha, Z. Dutton, "Achieving minimum-error discrimination of an arbitrary set of laser-light pulses," *Phys. Rev. A* 87, 052320 (2013) (May. 23, 2013).

Christopher A. Fuchs, Ruediger Schack, "Quantum-Bayesian Coherence," *Reviews of Modern Physics* 85, 1693–1715 (Apr. 01, 2013).

2013

A. D. Córcoles, Jay M. Gambetta, Jerry M. Chow, John A. Smolin, Matthew Ware, Joel Strand, B. L. T. Plourde, and M. Steffen, "Process verification of two-qubit quantum gates by randomized benchmarking," *Physical Review A* 87, 030301(R) (Mar. 19, 2013).

Martin Sandberg, Michael R. Vissers, Thomas A. Ohki, Jiansong Gao, Jose Aumentado, Martin Weides, David P. Pappas, "Long-lived, radiation-suppressed superconducting quantum bit in a planar geometry," *Appl. Phys. Lett.* 102, 072601 (2013) (Feb. 18, 2013).

M. M. Wilde and S. Guha, "Polar codes for classical quantum channels," *IEEE Transactions on Information Theory*, vol. 59, no. 2, pages 1175-1187 (Feb. 01, 2013).

2012

M. M. Wilde, P. Hayden, S. Guha, "Quantum trade-off coding for bosonic communication," *Phys. Rev. A* 86, 062306 (Dec. 06, 2012).

E. Magesan, J.M. Gambetta, B.R. Johnson, C.A. Ryan, J.M. Chow, S.T. Merkel, M.P. da Silva, G.A. Keefe, M.B. Rothwell, T.A. Ohki, M.B. Ketchen, and M. Steffen, "Efficient Measurement of Quantum Gate Error by Interleaved Randomized Benchmarking," *Phys. Rev. Lett.* 109, 080505 (Aug. 24, 2012).

O. Moussa, M. P. da Silva, C. A. Ryan, R. Laflamme, "Practical experimental certification of computational quantum gates via twirling," *Phys. Rev. Lett.* 109, 070504 (Aug. 17, 2012).

R. Nair, B. J. Yen, S. Guha, J. H. Shapiro and S. Pirandola, "Symmetric M-ary phase discrimination using quantum-optical probe states," *Phys. Rev. A.*, 86, 022306 (Aug. 07, 2012).

Félix Beaudoin, Marcus P. da Silva, Zachary Dutton, and Alexandre Blais, "First-order sidebands in circuit QED using qubit frequency modulation," *Phys. Rev. A* 86, 022305 (Aug. 03, 2012).

L. Steffen, M. P. da Silva, A. Fedorov, M. Baur, A. Wallraff, "Experimental Monte Carlo Quantum Process Certification," *Phys. Rev. Lett.* 108, 260506 (Jun. 28, 2012).

J.M. Gambetta, A.D. Corcoles, S.T. Merkel, B.R. Johnson, J.A. Smolin, J.M. Chow, C.A. Ryan, C. Rigetti, S. Poletto, T.A. Ohki, M.B. Ketchen, M. Steffen, "Measurement of selective control by simultaneous randomized benchmarking," *Phys. Rev. Lett.* 109, 240504 (Apr. 27, 2012).

M. M. Wilde, P. Hayden and S. Guha, "Information trade-offs for optical quantum communication," *Phys. Rev. Lett.*, 108, 140501 (Apr. 02, 2012).

M. Baur, A. Fedorov, L. Steffen, S. Filipp, M. P. da Silva, A. Wallraff, "Benchmarking a Quantum Teleportation Protocol in Superconducting Circuits Using Tomography and an Entanglement Witness," *Phys. Rev. Lett.* 108, 040502 (Jan. 24, 2012).

A. Fedorov, L. Steffen, M. Baur, M. P. da Silva, A. Wallraff, "Implementation of a Toffoli gate with superconducting circuits," *Nature* 481, 170–172 (Jan. 12, 2012).

J. S. Kline, M. R. Vissers, F. C. S. da Silva, D. S. Wisbey, M. Weides, Y. Shalibo, N. Katz, B. R. Johnson, T. A. Ohki, D. P. Pappas, "Sub-micrometer epitaxial Josephson junctions for quantum circuits," *Supercond. Sci. Technol.* 25 (Jan. 01, 2012).

J. Chen, J. L. Habif, Z. Dutton, R. Lazarus, S. Guha, "Optical codeword demodulation with error rates below standard quantum limit using a conditional nulling receiver," *Nature Photonics* (Jan. 01, 2012).

2011

- M. Weides, J. S. Kline, M. R. Vissers, M.O. Sandberg D. S. Wisbey, B. R. Johnson, T. A. Ohki, D. P. Pappas, "Coherence in a transmon qubit with epitaxial tunnel junctions," *Appl. Phys. Lett.* 99 (Dec. 01, 2011).
- M. P. da Silva, O. Landon-Cardinal, and D. Poulin, "Practical Characterization of Quantum Devices without Tomography," *Phys. Rev. Lett.*, 107, 210404 (Nov. 16, 2011).
- Saikat Guha, Zachary Dutton and Jonathan L. Habif, "Information in a Photon When Loss Encodes the Bit," *Proceedings of Frontiers in Optics* (Oct. 16, 2011).
- S. Guha, P. Basu, C.-K. Chau and R. Gibbens, "Green Wave Sleep Scheduling: Optimizing Latency and Throughput in Duty Cycling Wireless Networks," *IEEE Journal of Special Areas in Communications (JSAC)* (Sep. 08, 2011).
- Jonathan L. Habif, "Quantum frequency-entangled optical spread spectrum for stealthy target detection and communications," 2011 Conference on Lasers and Electro-Optics: Laser Science to Photonic Applications (May. 30, 2011).
- Jerry M. Chow, A.D. Corcoles, Jay M. Gambetta, Chad Rigetti, B.R. Johnson, John A. Smolin, J.R. Rozen, George A. Keefe, Mary B. Rothwell, Mark B. Ketchen, M. Steffen, "Simple all-microwave entangling gate for fixed-frequency superconducting qubits," *Phys. Rev. Lett.* 107, 080502 (Jan. 01, 2011).
- Hanhee Paik, D.I. Schuster, Lev S. Bishop, G. Kirchmair, G. Catelani, A.P. Sears, B.R. Johnson, M.J. Reagor, L. Frunzio, L.I. Glazman, S.M. Girvin, M.H. Devoret, and R.J. Schoelkopf, "Observation of high coherence in Josephson junction qubits measured in a three-dimensional circuit QED architecture," *Phys. Rev. Lett.* 107, 240501 (Jan. 01, 2011).
- S. Guha, "Structured optical receivers to attain superadditive capacity and the Holevo limit," *Phys. Rev. Lett.*, 106, 240502 (Jan. 01, 2011).
- S. Guha, J. L. Habif, and M. Takeoka, "Approaching Helstrom limits to optical pulse-position demodulation using single-photon detection and optical feedback," *J. of Modern Optics*, Volume 58, Issue 3, 257 (Jan. 01, 2011).

2010

- W. Kelly, Z. Dutton, J. Schlafer, B. Mookerji, T. Ohki, J. Kline, D. Pappas, "Direct Observation of Coherent Population Trapping in a Superconducting Artificial Atom," *Phys. Rev. Lett.* 104, 163601 (Jan. 01, 2010).
- Z. Dutton, J.H. Shapiro, S. Guha, "LADAR resolution improvement using receivers enhanced with squeezed-vacuum injection and phase-sensitive amplification," *J. Opt. Soc. Am. B* 27, A63–A72 (Jan. 01, 2010).
- A. Shabaev, Z. Dutton, T. A. Kennedy, and Al. L. Efros, "Slow-light propagation using mode locking of spin precession in quantum dots," *Phys. Rev. A* 82, 053823 (Jan. 01, 2010).
- G. Brummer, R. Rafique, T. A. Ohki, "Phase and Amplitude Modulator for Microwave Pulse Generation," *IEEE Transactions on Applied Superconductivity* (Jan. 01, 2010).
- J. L. Habif, "Quantum Cryptographic Networks," *Technology Today*, Issue 1 (Jan. 01, 2010).

2009

- S. Guha and B. I. Erkmen, "Receiver Design for Gaussian state Quantum Illumination," *Phys. Rev. A* 80, 052310 (Jan. 01, 2009).
- M. R. Rafique, T. A. Ohki, P. Linner and A. Herr, "Niobium Tunable Microwave Filters," *IEEE Trans. Microw. Theory Tech.*, 57, 5, 1 (Jan. 01, 2009).
- F.K. Fatemi, M.L. Terraciano, M. Bashkansky, and Z. Dutton, "Cold atom Raman spectrography using velocity-selective resonances," *Optics Express* 17, 12971-12980 (Jan. 01, 2009).
- F.K. Fatemi, M.L. Terraciano, Z. Dutton, and M. Bashkansky, "Imaging velocity selective resonances in a magnetic field," *J. of Modern Optics* 56, 2022-2028 (Jan. 01, 2009).
- C. Florea, M. Bashkansky, J. Sanghera, I. Aggarwal, Z. Dutton, "Slow-light generation through a Brillouin scattering in As₂S₃ fibers," *Optical Materials* 32, 358-361 (Jan. 01, 2009).

2008

- S. Guha, T. Hogg, D. Fattal, T. Spiller, and R. G. Beausoleil, "Quantum Auctions using Adiabatic Evolution: The Corrupt Auctioneer and Circuit Implementations," *International Journal of Quantum Information*, Vol. 6, No. 4 (Jan. 01, 2008).
- S.-H. Tan, B. I. Erkmen, V. Giovannetti, S. Guha, S. Lloyd, L. Maccone, S. Pirandola, and J. H. Shapiro, "Quantum Illumination using Gaussian States," *Phys. Rev. Lett.* 101, 253601 (Jan. 01, 2008).
- M. R. Rafique, T. A. Ohki, B. Banik, H. Engseth, P Linner and A. Herr, "Miniaturized Filters for Superconducting Microwave Filters," *Supercond. Sci. Technol.* 21 075004 (Jan. 01, 2008).

2007

- S. Guha, J. H. Shapiro, and B. I. Erkmen, "Capacities of Bosonic broadcast communications and a new minimum output entropy conjecture," *Phys. Rev. A* 76, 032303 (Sep. 04, 2007).
- Robert H. Hadfield, Jonathan L. Habif, Lijun Ma, Alan Mink, Xiao Tang and Sae Woo Nam, "Quantum key distribution with high-speed superconducting single-photon detectors," *Proceedings of Quantum Electronics and Laser Science Conference* (May. 06, 2007).
- G. D. Forney, M. Grassl, and S. Guha, "Convolutional and tail-biting quantum error-correcting codes," *IEEE Trans. Inf. Theory*, Vol. 53, No. 3 (Mar. 01, 2007).

2006

- Robert H. Hadfield, Jonathan L. Habif, John Schlafer, Robert E. Schwall and Sae Woo Nam, "Quantum key distribution at 1550 nm with twin superconducting single-photon detectors," *Applied Physics Letters* (Dec. 15, 2006).
- Martin A. Jaspán, Jonathan L. Habif, Robert H. Hadfield and Sae Woo Nam, "Heralding of telecommunication photon pairs with a superconducting single photon detector," *Applied Physics Letters* (Jul. 19, 2006).

2006

Jonathan L. Habib, David S. Pearson, Robert H. Hadfield, Robert E. Schwall, Sae Woo Nam and Aaron J. Miller, "Single Photon Detector Comparison in a Quantum Key Distribution Link Testbed," Proc. of SPIE Advanced Photon Counting Techniques (May. 01, 2006).

2005

J. H. Shapiro, S. Guha and B. I. Erkmen, "Ultimate channel capacity of free-space optical communications," The Journal of Optical Networking: Special Issue (invited) (Jul. 22, 2005).

2004

V. Giovannetti, S. Guha, S. Lloyd, L. Maccone, and J. H. Shapiro, "Minimum output entropy of bosonic channels: a conjecture," Phys. Rev. A 70, 032315 (Sep. 21, 2004).

V. Giovannetti, S. Guha, S. Lloyd, L. Maccone, J. H. Shapiro, and H. P. Yuen, "Classical capacity of the lossy bosonic channel: the exact solution," Phys. Rev. Lett. 92, 027902 (Jan. 15, 2004).

R.L. Huguenin, M.H. Wang, R. Biehl, S. Stoodley, J. Rogers, "Automated Subpixel Photobathymetry and Water Quality Mapping," Photogrammetric Engineering & Remote Sensing, Volume 70, Issue 1, 111-123 (Jan. 01, 2004).

2001

P. Ghose, A. S. Majumdar, S. Guha, and J. Sau, "Bohmian trajectories for photons," Phys. Lett. A 290, 205–213 (Nov. 19, 2001).