References

Abbasi, M. R. and Golshan, M. M., (2013), "Thermal entanglement of a two-level atom and bimodal photons in a Kerr nonlinear coupler", *Physica A: Statistical Mechanics and its Applications,* Vol.392, No.23, pp.6161–6167, 2013

Abbott, B. P., Abbott, R., Abbott, T. D., Abernathy, M. R., Acernese, F., Ackley, K., Adams, C., Adams, T., Addesso, P., Adhikari, R., et al., (2016a), "Observation of gravitational waves from a binary black hole merger", *Physical Review Letters,* Vol.116, No.6, pp.061102, 2016

Abbott, B. P., Abbott, R., Abbott, T. D., Abernathy, M. R., Acernese, F., Ackley, K., Adams, C., Adams, T., Addesso, P., Adhikari, R. X., et al., (2016b), "GW151226: observation of gravitational waves from a 22-solar-mass binary black hole coalescence", *Physical Review Letters,* Vol.116, No.24, pp.241103, 2016

Abdel-Aty, M., Azzeer, A., and Abdalla, M. S., (2010), "Anabiosis of phase distribution of a three-level atom", *Physica A: Statistical Mechanics and its Applications,* Vol.389, No.17, pp.3375–3381, 2010

Agarwal, G. and Tara, K., (1991), "Nonclassical properties of states generated by the excitations on a coherent state", *Physical Review A,* Vol.43, No.1, pp.492, 1991

Agarwal, G. S., (2013), *Quantum Optics*, Cambridge University Press, Cambridge, 2013

Agarwal, G. S., Chaturvedi, S., Tara, K., and Srinivasan, V., (1992), "Classical phase changes in nonlinear processes and their quantum counterparts", *Physical Review A,* Vol.45, No.7, pp.4904, 1992

Agarwal, G. S. and Singh, R. P., (1996), "Complementarity and phase distributions for angular momentum systems", *Physics Letters A,* Vol.217, No.4-5, pp.215–218, 1996

Agarwal, G. S. and Tara, K., (1992), "Nonclassical character of states exhibiting no squeezing or sub-Poissonian statistics", *Physical Review A,* Vol.46, No.1, pp.485, 1992

Ahn, J., Weinacht, T., and Bucksbaum, P., (2000), "Information storage and retrieval through quantum phase", *Science,* Vol.287, No.5452, pp.463–465, 2000

Alam, M., Mandal, S., and Wahiddin, M. R., (2017a), "Quantum phase fluctuations of coherent and thermal light coupled to a non-degenerate parametric oscillator beyond rotating wave approximation", *Optics Communications,* Vol.398,, pp.1–11, 2017

Alam, N., Mandal, K., and Pathak, A., (2018a), "Higher-order nonclassical properties of a shifted symmetric cat state and a one-dimensional continuous superposition of coherent states", *International Journal of Theoretical Physics,* Vol.57, No.11, pp.3443–3456, 2018

Alam, N. and Mandal, S., (2016a), "Nonclassical properties of coherent light in a pair of coupled anharmonic oscillators", *Optics Communications,* Vol.359,, pp.221–233, 2016

Alam, N. and Mandal, S., (2016b), "On the quantum phase fluctuations of coherent light in a chain of two anharmonic oscillators coupled through a linear one", *Optics Communications,* Vol.366,, pp.340–348, 2016

Alam, N., Mandal, S., and Öhberg, P., (2015), "Approximate analytical solutions of a pair of coupled anharmonic oscillators", *Journal of Physics B: Atomic, Molecular and Optical Physics,* Vol.48,

No.4, pp.045503, 2015

Alam, N., Thapliyal, K., Pathak, A., Sen, B., Verma, A., and Mandal, S., (2017b), "Lower- and higher-order nonclassicality in a Bose-condensed optomechanical-like system and a Fabry-Perot cavity with one movable mirror: squeezing, antibunching and entanglement", *arXiv preprint arXiv:1708.03967,*, 2017

Alam, N., Verma, A., and Pathak, A., (2017c), "Higher order nonclassicalities of finite dimensional coherent states: A comparative study", *arXiv preprint arXiv:1712.10135,*, 2017

Alam, N., Verma, A., and Pathak, A., (2018b), "Higher-order nonclassicalities of finite dimensional coherent states: A comparative study", *Physics Letters A,* Vol.382, No.28, pp.1842–1851, 2018

Allevi, A., Olivares, S., and Bondani, M., (2012a), "High-order photon-number correlations: a resource for characterization and applications of quantum states", *International Journal of Quantum Information,* Vol.10, No.08, pp.1241003, 2012

Allevi, A., Olivares, S., and Bondani, M., (2012b), "Measuring high-order photon-number correlations in experiments with multimode pulsed quantum states", *Physical Review A,* Vol.85, No.6, pp.063835, 2012

Alsing, P., Guo, D.-S., and Carmichael, H., (1992), "Dynamic Stark effect for the Jaynes-Cummings system", *Physical Review A,* Vol.45, No.7, pp.5135, 1992

An, N. B., (2002), "Multimode higher-order antibunching and squeezing in trio coherent states", *Journal of Optics B: Quantum and Semiclassical Optics,* Vol.4, No.3, pp.222, 2002

Asbóth, J. K., Calsamiglia, J., and Ritsch, H., (2005), "Computable measure of nonclassicality for light", *Physical Review Letters,* Vol.94, No.17, pp.173602, 2005

Avenhaus, M., Laiho, K., Chekhova, M., and Silberhorn, C., (2010), "Accessing higher order correlations in quantum optical states by time multiplexing", *Physical review letters,* Vol.104, No.6, pp.063602, 2010

Banerjee, A., Thapliyal, K., Shukla, C., and Pathak, A., (2018), "Quantum Conference", *Quantum Information Processing,* Vol.17,, pp.161, 2018

Banerjee, S., (2018), *Open Quantum Systems: Dynamics of Nonclassical Evolution*, Springer and Hindustan Book Agency, 2018

Banerjee, S., Ghosh, J., and Ghosh, R., (2007), "Phase-diffusion pattern in quantum-nondemolition systems", *Physical Review A,* Vol.75, No.6, pp.062106, 2007

Banerjee, S. and Ghosh, R., (2007), "Dynamics of decoherence without dissipation in a squeezed thermal bath", *Journal of Physics A: Mathematical and Theoretical,* Vol.40, No.45, pp.13735, 2007

Banerjee, S., Ravishankar, V., and Srikanth, R., (2010a), "Dynamics of entanglement in two-qubit open system interacting with a squeezed thermal bath via dissipative interaction", *Annals of Physics,* Vol.325, No.4, pp.816–834, 2010

Banerjee, S., Ravishankar, V., and Srikanth, R., (2010b), "Entanglement dynamics in two-qubit open system interacting with a squeezed thermal bath via quantum nondemolition interaction", *The European Physical Journal D-Atomic, Molecular, Optical and Plasma Physics,* Vol.56, No.2, pp.277–290, 2010

Banerjee, S. and Srikanth, R., (2007), "Phase diffusion in quantum dissipative systems", *Physical Review A,* Vol.76, No.6, pp.062109, 2007

Banerjee, S. and Srikanth, R., (2010), "Complementarity in generic open quantum systems", *Modern Physics Letters B,* Vol.24, No.24, pp.2485–2509, 2010

Barnett, S. M. and Pegg, D., (1990), "Quantum theory of rotation angles", *Physical Review A,* Vol.41, No.7, pp.3427, 1990

Barnett, S. M. and Pegg, D. T., (1986), "Phase in quantum optics", *Journal of Physics A: Mathe-*

matical and General, Vol.19, No.18, pp.3849, 1986

Bazrafkan, M. R. and Man'ko, V. I., (2004), "Tomography of binomial states of the radiation field", *Journal of Russian Laser Research,* Vol.25, No.5, pp.453–467, 2004

Beck, M., Smithey, D. T., and Raymer, M. G., (1993), "Experimental determination of quantum-phase distributions using optical homodyne tomography", *Physical Review A,* Vol.48, No.2, pp.R890, 1993

Bennett, C. H. and Brassard, G., (1984), "Quantum cryptography: public key distribution and coin tossing", In *International Conference on Computer System and Signal Processing, IEEE, 1984*, pp. 175–179

Bennett, C. H., Brassard, G., Crépeau, C., Jozsa, R., Peres, A., and Wootters, W. K., (1993), "Teleporting an unknown quantum state via dual classical and Einstein-Podolsky-Rosen channels", *Physical Review Letters,* Vol.70, No.13, pp.1895, 1993

Bennett, C. H., Brassard, G., and Mermin, N. D., (1992), "Quantum cryptography without Bell's theorem", *Physical Review Letters,* Vol.68, No.5, pp.557, 1992

Bennett, C. H. and Wiesner, S. J., (1992), "Communication via one-and two-particle operators on Einstein-Podolsky-Rosen states", *Physical Review Letters,* Vol.69, No.20, pp.2881, 1992

Biamonte, J., Wittek, P., Pancotti, N., Rebentrost, P., Wiebe, N., and Lloyd, S., (2017), "Quantum machine learning", *Nature,* Vol.549,, pp.195–202, 2017

Blažek, M., (1994), "High energy hadronic multiplicity distributions in presence of noisy squeezing and noisy displaced Fock states", *Czechoslovak Journal of Physics,* Vol.44, No.9, pp.809–826, 1994

Borelli, L. F., Aguiar, L. d. S., Roversi, J. A., and Vidiella-Barranco, A., (2016), "Quantum key distribution using continuous-variable non-Gaussian states", *Quantum Information Processing,* Vol.15, No.2, pp.893–904, 2016

Branciard, C., Cavalcanti, E. G., Walborn, S. P., Scarani, V., and Wiseman, H. M., (2012), "One-sided device-independent quantum key distribution: security, feasibility, and the connection with steering", *Physical Review A,* Vol.85, No.1, pp.010301, 2012

Brassard, G., Braunstein, S. L., and Cleve, R., (1998), "Teleportation as a quantum computation", *Physica D: Nonlinear Phenomena,* Vol.120, No.1, pp.43–47, 1998

Brown, R. H. and Twiss, R. Q., (1956), "Correlation between photons in two coherent beams of light", *Nature,* Vol.177, No.4497, pp.27–29, 1956

Brune, M., Haroche, S., Raimond, J., Davidovich, L., and Zagury, N., (1992), "Manipulation of photons in a cavity by dispersive atom-field coupling: Quantum-nondemolition measurements and generation of Schrodinger cat states", *Physical Review A,* Vol.45, No.7, pp.5193, 1992

Carruthers, P. and Nieto, M. M., (1968), "Phase and angle variables in quantum mechanics", *Reviews of Modern Physics,* Vol.40, No.2, pp.411, 1968

Chakrabarty, I., Banerjee, S., and Siddharth, N., (2011), "A study of quantum correlations in open quantum systems", *Quant. Info and Comp,* Vol.11,, pp.541, 2011

Chen, Y., (2015), "Bidirectional quantum controlled teleportation by using a genuine six-qubit entangled state", *International Journal of Theoretical Physics,* Vol.54, No.1, pp.269–272, 2015

Courtland, R., (2017), "Google aims for quantum computing supremacy [News]", *IEEE Spectrum,* Vol.54, No.6, pp.9–10, 2017

Dakna, M., Knöll, L., and Welsch, D.-G., (1998), "Quantum state engineering using conditional measurement on a beam splitter", *The European Physical Journal D-Atomic, Molecular, Optical and Plasma Physics,* Vol.3, No.3, pp.295–308, 1998

Das, M., Sen, B., Ray, A., and Pathak, A., (2018), "Lower Order and Higher Order Entanglement in Four-Wave Mixing Process", *Annalen der Physik,* Vol.530, No.1, pp.1700160, 2018

De Oliveira, F., Kim, M., Knight, P. L., and Buek, V., (1990), "Properties of displaced number states", *Physical Review A,* Vol.41, No.5, pp.2645, 1990

de Oliveira, G. C., de Almeida, A. R., de Queirós, I. P., Moraes, A. M., and Dantas, C. M., (2005), "Alternative proposal for the generation of the displaced number state", *Physica A: Statistical Mechanics and its Applications,* Vol.351, No.2-4, pp.251–259, 2005

De Oliveira, G. C., Do Vale, A. L., and Dantas, C. M., (2006), "Nonlinear even and odd displaced number state", *Modern Physics Letters B,* Vol.20, No.18, pp.1135–1146, 2006

DellAnno, F., De Siena, S., and Illuminati, F., (2006), "Multiphoton quantum optics and quantum state engineering", *Physics Reports,* Vol.428, No.2-3, pp.53–168, 2006

Demkowicz-Dobrzański, R., Jarzyna, M., and Kołodyński, J., (2015), "Quantum limits in optical interferometry", In *Progress in Optics*, volume 60, pp. 345–435, Elsevier

Denschlag, J., Simsarian, J. E., Feder, D. L., Clark, C. W., Collins, L. A., Cubizolles, J., Deng, L., Hagley, E. W., Helmerson, K., Reinhardt, W. P., et al., (2000), "Generating solitons by phase engineering of a Bose-Einstein condensate", *Science,* Vol.287, No.5450, pp.97–101, 2000

Dhar, H. S., Banerjee, S., Chatterjee, A., and Ghosh, R., (2013), "Controllable quantum correlations of two-photon states generated using classically driven three-level atoms", *Annals of Physics,* Vol.331,, pp.97–109, 2013

Dirac, P. A. M., (1927), "The quantum theory of the emission and absorption of radiation", In *Proceedings of the Royal Society of London A: Mathematical, Physical and Engineering Sciences*, volume 114, pp. 243–265

Dodonov, V. and De Souza, L., (2005), "Decoherence of superpositions of displaced number states", *Journal of Optics B: Quantum and Semiclassical Optics,* Vol.7, No.12, pp.S490, 2005

Dodonov, V. and Renó, M., (2003), "Classicality and anticlassicality measures of pure and mixed quantum states", *Physics Letters A,* Vol.308, No.4, pp.249–255, 2003

Einstein, A., (1905), "Ist die Trägheit eines Körpers von seinem Energieinhalt abhängig?", *Annalen der Physik,* Vol.323, No.13, pp.639–641, 1905

Ekert, A. K., (1991), "Quantum cryptography based on Bell's theorem", *Physical Review Letters,* Vol.67, No.6, pp.661, 1991

El-Orany, F. A., Perina, J., and Abdalla, M. S., (2000), "Phase properties of the superposition of squeezed and displaced number states", *Journal of Optics B: Quantum and Semiclassical Optics,* Vol.2, No.4, pp.545, 2000

Emery, V. and Kivelson, S., (1995), "Importance of phase fluctuations in superconductors with small superfluid density", *Nature,* Vol.374, No.6521, pp.434–437, 1995

Escher, B., Avelar, A., da Rocha Filho, T., and Baseia, B., (2004), "Controlled hole burning in the Fock space via conditional measurements on beam splitters", *Physical Review A,* Vol.70, No.2, pp.025801, 2004

Fox, M., (2006), *Quantum Optics: An Introduction*, Oxford University Press, Oxford, 2006

Furusawa, A., Sørensen, J. L., Braunstein, S. L., Fuchs, C. A., Kimble, H. J., and Polzik, E. S., (1998), "Unconditional quantum teleportation", *Science,* Vol.282, No.5389, pp.706–709, 1998

Gantsog, T., (1992), "Collapses and revivals of phase fluctuations in parametric down-conversion with quantum pump", *Physics Letters A,* Vol.170, No.4, pp.249–254, 1992

Gantsog, T., Tanaś, R., and Zawodny, R., (1991), "Quantum phase fluctuations in parametric down-conversion with quantum pump", *Optics Communications,* Vol.82, No.3-4, pp.345–350, 1991

Gao, W.-B., Lu, C.-Y., Yao, X.-C., Xu, P., Gühne, O., Goebel, A., Chen, Y.-A., Peng, C.-Z., Chen, Z.-B., and Pan, J.-W., (2010), "Experimental demonstration of a hyper-entangled ten-qubit Schrodinger cat state", *Nature Physics,* Vol.6, No.5, pp.331, 2010

Garraway, B. M. and Knight, P. L., (1992), "Quantum phase distributions and quasidistributions",

Physical Review A, Vol.46, No.9, pp.R5346, 1992

Gerry, C. C., (1987), "On the phase fluctuations of coherent light interacting with an anharmonic oscillator", *Optics communications,* Vol.63, No.4, pp.278–280, 1987

Gerry, C. C., (1993), "Non-classical properties of even and odd coherent states", *Journal of Modern Optics,* Vol.40, No.6, pp.1053–1071, 1993

Gerry, C. C. and Benmoussa, A., (2002), "Hole burning in the Fock space of optical fields", *Physics Letters A,* Vol.303, No.1, pp.30–36, 2002

Gerry, C. C. and Grobe, R., (1994), "Statistical properties of squeezed Kerr states", *Physical Review A,* Vol.49, No.3, pp.2033, 1994

Giovannetti, V., Lloyd, S., and Maccone, L., (2006), "Quantum metrology", *Physical Review Letters,* Vol.96, No.1, pp.010401, 2006

Giovannetti, V., Lloyd, S., and Maccone, L., (2011), "Advances in quantum metrology", *Nature Photonics,* Vol.5, No.4, pp.222, 2011

Gisin, N., Ribordy, G., Tittel, W., and Zbinden, H., (2002), "Quantum cryptography", *Reviews of modern physics,* Vol.74, No.1, pp.145, 2002

Glauber, R. J., (1963a), "Coherent and incoherent states of the radiation field", *Physical Review,* Vol.131, No.6, pp.2766, 1963

Glauber, R. J., (1963b), "Photon correlations", *Physical Review Letters,* Vol.10, No.3, pp.84, 1963

Grosshans, F. and Grangier, P., (2002), "Continuous variable quantum cryptography using coherent states", *Physical Review Letters,* Vol.88, No.5, pp.057902, 2002

Grover, L. K., (1997), "Quantum mechanics helps in searching for a needle in a haystack", *Physical Review Letters,* Vol.79, No.2, pp.325, 1997

Gupta, P. and Pathak, A., (2007), "Reduction of quantum phase fluctuations implies antibunching of photon", *Physics Letters A,* Vol.365, No.5-6, pp.393–399, 2007

Hamar, M., Michálek, V., and Pathak, A., (2014), "Non-classical Signature of Parametric Fluorescence and its Application in Metrology", *Measurement Science Review,* Vol.14, No.4, pp.227–236, 2014

Higgins, B. L., Berry, D. W., Bartlett, S. D., Wiseman, H. M., and Pryde, G. J., (2007), "Entanglement-free Heisenberg-limited phase estimation", *Nature,* Vol.450, No.7168, pp.393, 2007

Hillery, M., (1985), "Classical pure states are coherent states", *Physics Letters A,* Vol.111, No.8-9, pp.409–411, 1985

Hillery, M., (1987a), "Amplitude-squared squeezing of the electromagnetic field", *Physical Review A,* Vol.36, No.8, pp.3796, 1987

Hillery, M., (1987b), "Nonclassical distance in quantum optics", *Physical Review A,* Vol.35, No.2, pp.725, 1987

Hillery, M., (2000), "Quantum cryptography with squeezed states", *Physical Review A,* Vol.61, No.2, pp.022309, 2000

Hillery, M., Bužek, V., and Berthiaume, A., (1999), "Quantum secret sharing", *Physical Review A,* Vol.59, No.3, pp.1829, 1999

Hirano, T., Ichikawa, T., Matsubara, T., Ono, M., Oguri, Y., Namiki, R., Kasai, K., Matsumoto, R., and Tsurumaru, T., (2017), "Implementation of continuous-variable quantum key distribution with discrete modulation", *Quantum Science and Technology,* Vol.2, No.2, pp.024010, 2017

Hong, C. K. and Mandel, L., (1985a), "Generation of higher-order squeezing of quantum electromagnetic fields", *Physical Review A,* Vol.32, No.2, pp.974, 1985

Hong, C. K. and Mandel, L., (1985b), "Higher-order squeezing of a quantum field", *Physical Review Letters,* Vol.54, No.4, pp.323, 1985

Hong, L. and Guang-Can, G., (1999), "Nonclassical properties of photon-added pair coherent states", *Acta Physica Sinica (Overseas Edition),* Vol.8, No.8, pp.577, 1999

Horak, P., (2004), "The role of squeezing in quantum key distribution based on homodyne detection and post-selection", *Journal of Modern Optics,* Vol.51, No.8, pp.1249–1264, 2004

Huang, D., Huang, P., Lin, D., and Zeng, G., (2016), "Long-distance continuous-variable quantum key distribution by controlling excess noise", *Scientific Reports,* Vol.6,, pp.19201, 2016

Husimi, K., (1940), "Some formal properties of the density matrix", *Proceedings of the Physico-Mathematical Society of Japan [Nippon Sugaku-Buturigakkwai Kizi Dai 3 Ki],* Vol.22, No.4, pp.264–314, 1940

Imry, Y., (1971), "On the relevance of quantum phase fluctuations", *Physica,* Vol.55,, pp.344–350, 1971

Keil, R., Perez-Leija, A., Dreisow, F., Heinrich, M., Moya-Cessa, H., Nolte, S., Christodoulides, D. N., and Szameit, A., (2011), "Classical analogue of displaced Fock states and quantum correlations in Glauber-Fock photonic lattices", *Physical Review Letters,* Vol.107, No.10, pp.103601, 2011

Kenfack, A. and Życzkowski, K., (2004), "Negativity of the Wigner function as an indicator of non-classicality", *Journal of Optics B: Quantum and Semiclassical Optics,* Vol.6, No.10, pp.396, 2004

Klyshko, D. N., (1996), "Observable signs of nonclassical light", *Physics Letters A,* Vol.213, No.1-2, pp.7–15, 1996

Kues, M., Reimer, C., Roztocki, P., Cortés, L. R., Sciara, S., Wetzel, B., Zhang, Y., Cino, A., Chu, S. T., Little, B. E., et al., (2017), "On-chip generation of high-dimensional entangled quantum states and their coherent control", *Nature,* Vol.546, No.7660, pp.622, 2017

Lanzagorta, M., (2011), "Quantum radar", *Synthesis Lectures on Quantum Computing,* Vol.3, No.1, pp.1–139, 2011

Lee, C. T., (1990), "Higher-order criteria for nonclassical effects in photon statistics", *Physical Review A,* Vol.41, No.3, pp.1721, 1990

Lee, C. T., (1991), "Measure of the nonclassicality of nonclassical states", *Physical Review A,* Vol.44, No.5, pp.R2775, 1991

Lee, C. T., (1995), "Theorem on nonclassical states", *Physical Review A,* Vol.52, No.4, pp.3374, 1995

Lee, S.-Y. and Nha, H., (2010), "Quantum state engineering by a coherent superposition of photon subtraction and addition", *Physical Review A,* Vol.82, No.5, pp.053812, 2010

Leonhardt, U. and Paul, H., (1993), "Phase measurement and Q function", *Physical Review A,* Vol.47, No.4, pp.R2460, 1993

Leonhardt, U., Vaccaro, J. A., Böhmer, B., and Paul, H., (1995), "Canonical and measured phase distributions", *Physical Review A,* Vol.51, No.1, pp.84, 1995

Lo, C., (1991), "Generating displaced and squeezed number states by a general driven time-dependent oscillator", *Physical Review A,* Vol.43, No.1, pp.404, 1991

Louisell, W. H., (1963), "Amplitude and phase uncertainty relations", *Physics Letters,* Vol.7,, 1963

Lu, C.-Y., Zhou, X.-Q., Gühne, O., Gao, W.-B., Zhang, J., Yuan, Z.-S., Goebel, A., Yang, T., and Pan, J.-W., (2007), "Experimental entanglement of six photons in graph states", *Nature Physics,* Vol.3, No.2, pp.91, 2007

Lütkenhaus, N. and Barnett, S. M., (1995), "Nonclassical effects in phase space", *Physical Review A,* Vol.51, No.4, pp.3340, 1995

Lvovsky, A. and Babichev, S., (2002), "Synthesis and tomographic characterization of the displaced Fock state of light", *Physical Review A,* Vol.66, No.1, pp.011801, 2002

Lvovsky, A. I., Hansen, H., Aichele, T., Benson, O., Mlynek, J., and Schiller, S., (2001), "Quantum state reconstruction of the single-photon Fock state", *Physical Review Letters,* Vol.87, No.5, pp.050402, 2001

Lynch, R., (1987), "Phase fluctuations in a squeezed state using measured phase operators", *JOSA B,* Vol.4, No.10, pp.1723–1726, 1987

Ma, H.-X., Huang, P., Bai, D.-Y., Wang, S.-Y., Bao, W.-S., and Zeng, G.-H., (2018), "Continuous-variable measurement-device-independent quantum key distribution with photon subtraction", *Physical Review A,* Vol.97, No.4, pp.042329, 2018

Malpani, P., Alam, N., Thapliyal, K., Pathak, A., Narayanan, V., and Banerjee, S., (2019a), "Lower- and Higher-Order Nonclassical Properties of Photon Added and Subtracted Displaced Fock States", *Annalen der Physik,* Vol.531, No.2, pp.1800318, 2019

Malpani, P., Alam, N., Thapliyal, K., Pathak, A., Narayanan, V., and Banerjee, S., (2020a), "Manipulating nonclassicality via quantum state engineering processes: Vacuum filtration and single photon addition", *Annalen der Physik,* Vol.532, No.1, pp.1900337, 2020

Malpani, P., Thapliyal, K., Alam, N., Pathak, A., Narayanan, V., and Banerjee, S., (2019b), "Quantum phase properties of photon added and subtracted displaced Fock states", *Annalen der Physik,*, pp.1900141, 2019

Malpani, P., Thapliyal, K., Alam, N., Pathak, A., Narayanan, V., and Banerjee, S., (2020b), "Impact of photon addition and subtraction on nonclassical and phase properties of a displaced Fock state", *Optics Communications,* Vol.459,, pp.124964, 2020

Mandel, L., (1979), "Sub-Poissonian photon statistics in resonance fluorescence", *Optics Letters,* Vol.4, No.7, pp.205–207, 1979

Marchiolli, M. A. and José, W. D., (2004), "Engineering superpositions of displaced number states of a trapped ion", *Physica A: Statistical Mechanics and its Applications,* Vol.337, No.1-2, pp.89–108, 2004

Mari, A., Kieling, K., Nielsen, B. M., Polzik, E., and Eisert, J., (2011), "Directly estimating nonclassicality", *Physical review letters,* Vol.106, No.1, pp.010403, 2011

Meher, N. and Sivakumar, S., (2018), "Number state filtered coherent states", *Quantum Information Processing,* Vol.17, No.9, pp.233, Jul 2018

Mendas, I. and Popovic, D., (1993), "Pancharatnam phase for displaced number states", *Journal of Physics A: Mathematical and General,* Vol.26, No.13, pp.3313, 1993

Miranowicz, A., Bartkiewicz, K., Pathak, A., Perina Jr., J., Chen, Y.-N., and Nori, F., (2015), "Statistical mixtures of states can be more quantum than their superpositions: comparison of nonclassicality measures for single-qubit states", *Physical Review A,* Vol.91, No.4, pp.042309, 2015

Miranowicz, A., Bartkowiak, M., Wang, X., Liu, Y.-x., and Nori, F., (2010), "Testing nonclassicality in multimode fields: a unified derivation of classical inequalities", *Physical Review A,* Vol.82, No.1, pp.013824, 2010

Miranowicz, A. and Leonski, W., (2004), "Dissipation in systems of linear and nonlinear quantum scissors", *Journal of Optics B: Quantum and Semiclassical Optics,* Vol.6, No.3, pp.S43, 2004

Miranowicz, A., Leonski, W., and Imoto, N., (2001), "Quantum-optical states in finite-dimensional Hilbert space. I. General formalism", *Advances in Chemical Physics,* Vol.119, No.1, pp.155–194, 2001

Miranowicz, A., Piani, M., Horodecki, P., and Horodecki, R., (2009), "Inseparability criteria based on matrices of moments", *Physical Review A,* Vol.80, No.5, pp.052303, 2009

Moya-Cessa, H., (1995), "Generation and properties of superpositions of displaced Fock states", *Journal of Modern Optics,* Vol.42, No.8, pp.1741–1754, 1995

Naikoo, J., Thapliyal, K., Pathak, A., and Banerjee, S., (2018), "Probing nonclassicality in an

optically driven cavity with two atomic ensembles", *Physical Review A,* Vol.97, No.6, pp.063840, 2018

Noh, J. W., Fougeres, A., and Mandel, L., (1991), "Measurement of the quantum phase by photon counting", *Physical Review Letters,* Vol.67, No.11, pp.1426, 1991

Noh, J. W., Fougeres, A., and Mandel, L., (1992), "Operational approach to the phase of a quantum field", *Physical Review A,* Vol.45, No.1, pp.424, 1992

Ou, Z., (1997), "Fundamental quantum limit in precision phase measurement", *Physical Review A,* Vol.55, No.4, pp.2598, 1997

Ourjoumtsev, A., Jeong, H., Tualle-Brouri, R., and Grangier, P., (2007), "Generation of optical Schrodinger cats from photon number states", *Nature,* Vol.448, No.7155, pp.784, 2007

Parigi, V., Zavatta, A., Kim, M., and Bellini, M., (2007), "Probing quantum commutation rules by addition and subtraction of single photons to/from a light field", *Science,* Vol.317, No.5846, pp.1890–1893, 2007

Park, Y., Depeursinge, C., and Popescu, G., (2018), "Quantitative phase imaging in biomedicine", *Nature Photonics,* Vol.12, No.10, pp.578, 2018

Pathak, A., (2002), "Quantum fluctations of coherent light in nonlinear media", *Ph. D. Thesis, arXiv preprint quant-ph/0207034,*, 2002

Pathak, A., (2013), *Elements of Quantum Computation and Quantum Communication*, Taylor & Francis, 2013

Pathak, A. and Garcia, M. E., (2006), "Control of higher order antibunching", *Applied Physics B,* Vol.84, No.3, pp.479–484, 2006

Pathak, A. and Ghatak, A., (2018), "Classical light vs. nonclassical light: characterizations and interesting applications", *Journal of Electromagnetic Waves and Applications,* Vol.32, No.2, pp.229–264, 2018

Pathak, A. and Mandal, S., (2000), "Phase fluctuations of coherent light coupled to a nonlinear medium of inversion symmetry", *Physics Letters A,* Vol.272, No.5-6, pp.346–352, 2000

Pathak, A. and Verma, A., (2010), "Recent developments in the study of higher order nonclassical states", *Indian Journal of Physics,* Vol.84, No.8, pp.1005–1019, 2010

Pegg, D. and Barnett, S., (1988), "Unitary phase operator in quantum mechanics", *EPL (Europhysics Letters),* Vol.6, No.6, pp.483, 1988

Pegg, D. T. and Barnett, S. M., (1989), "Phase properties of the quantized single-mode electromagnetic field", *Physical Review A,* Vol.39, No.4, pp.1665, 1989

Peřina, J. and Křepelka, J., (2019), "Quasidistribution of phases", *Optics Communications,* Vol.437,, pp.373–376, 2019

Peřina Jr, J., Michálek, V., and Haderka, O., (2017), "Higher-order sub-Poissonian-like nonclassical fields: Theoretical and experimental comparison", *Physical Review A,* Vol.96, No.3, pp.033852, 2017

Peřinová, V., Lukš, A., and Peřina, J., (1998), *Phase in Optics*, World Scientific, 1998

Pinheiro, P. V. P. and Ramos, R. V., (2013), "Quantum communication with photon-added coherent states", *Quantum Information Processing,* Vol.12, No.1, pp.537–547, 2013

Planck, M., (1901), "On the law of distribution of energy in the normal spectrum", *Annalen der physik,* Vol.4, No.553, pp.1, 1901

Podoshvedov, S. A., (2014), "Extraction of displaced number states", *JOSA B,* Vol.31, No.10, pp.2491–2503, 2014

Prakash, H., Kumar, P., and Mishra, D. K., (2010), "Detection of amplitude-squared squeezing via homodyne method", *International Journal of Modern Physics B,* Vol.24, No.28, pp.5547–5551, 2010

Prakash, H. and Mishra, D. K., (2006), "Higher order sub-Poissonian photon statistics and their use in detection of Hong and Mandel squeezing and amplitude-squared squeezing", *Journal of Physics B: Atomic, Molecular and Optical Physics,* Vol.39, No.9, pp.2291, 2006

Raffaelli, F., Sibson, P., Kennard, J. E., Mahler, D. H., Thompson, M. G., and Matthews, J. C., (2018), "A SOI Integrated Quantum Random Number Generator Based on Phase fluctuations from a Laser Diode", *arXiv preprint arXiv:1804.05046,*, 2018

Rauschenbeutel, A., Nogues, G., Osnaghi, S., Bertet, P., Brune, M., Raimond, J.-M., and Haroche, S., (2000), "Step-by-step engineered multiparticle entanglement", *Science,* Vol.288, No.5473, pp.2024–2028, 2000

Resch, K. J., Pregnell, K. L., Prevedel, R., Gilchrist, A., Pryde, G. J., O'Brien, J. L., and White, A. G., (2007), "Time-reversal and super-resolving phase measurements", *Physical ReviewLletters,* Vol.98, No.22, pp.223601, 2007

Richter, T. and Vogel, W., (2002), "Nonclassicality of quantum states: a hierarchy of observable conditions", *Physical Review Letters,* Vol.89, No.28, pp.283601, 2002

Sanders, B., Barnett, S. M., and Knight, P., (1986), "Phase variables and squeezed states", *Optics Communications,* Vol.58, No.4, pp.290–294, 1986

Sanders, B. and Milburn, G., (1995), "Optimal quantum measurements for phase estimation", *Physical Review Letters,* Vol.75, No.16, pp.2944, 1995

Satyanarayana, M. V., (1985), "Generalized coherent states and generalized squeezed coherent states", *Physical Review D,* Vol.32, No.2, pp.400, 1985

Schrödinger, E., (1926), "Der stetige Übergang von der Mikro-zur Makromechanik", *Naturwissenschaften,* Vol.14, No.28, pp.664–666, 1926

Scully, M. O. and Zubairy, M. S., (1997), *Quantum Optics*, Cambridge University Press, Cambridge, 1997

Seshadreesan, K. P., Olson, J. P., Motes, K. R., Rohde, P. P., and Dowling, J. P., (2015), "Boson sampling with displaced single-photon Fock states versus single-photon-added coherent states: The quantum-classical divide and computational-complexity transitions in linear optics", *Physical Review A,* Vol.91, No.2, pp.022334, 2015

Sharma, R. D., Thapliyal, K., and Pathak, A., (2017), "Quantum sealed-bid auction using a modified scheme for multiparty circular quantum key agreement", *Quantum Information Processing,* Vol.16, No.7, pp.169, 2017

Shchukin, E. and Vogel, W., (2005a), "Inseparability criteria for continuous bipartite quantum states", *Physical Review Letters,* Vol.95, No.23, pp.230502, 2005

Shchukin, E. V. and Vogel, W., (2005b), "Nonclassical moments and their measurement", *Physical Review A,* Vol.72, No.4, pp.043808, 2005

Shor, P. W., (1999), "Polynomial-time algorithms for prime factorization and discrete logarithms on a quantum computer", *SIAM (Society for Industrial and Applied Mathematics) Review,* Vol.41, No.2, pp.303–332, 1999

Smithey, D. T., Beck, M., Cooper, J., Raymer, M. G., and Faridani, A., (1993), "Complete experimental characterization of the quantum state of a light mode via the Wigner function and the density matrix: application to quantum phase distributions of vacuum and squeezed-vacuum states", *Physica Scripta,* Vol.1993, No.T48, pp.35, 1993

Sperling, J., Vogel, W., and Agarwal, G., (2014), "Quantum state engineering by click counting", *Physical Review A,* Vol.89, No.4, pp.043829, 2014

Srikanth, R. and Banerjee, S., (2009), "Complementarity in atomic (finite-level quantum) systems: an information-theoretic approach", *The European Physical Journal D-Atomic, Molecular, Optical and Plasma Physics,* Vol.53, No.2, pp.217–227, 2009

Srikanth, R. and Banerjee, S., (2010), "Complementarity in atomic and oscillator systems", *Physics Letters A,* Vol.374, No.31, pp.3147–3150, 2010

Srikara, S., Thapliyal, K., and Pathak, A., (2019), "Continuous variable B92 quantum key distribution protocol using single photon added and subtracted coherent states", *arXiv preprint arXiv:1906.07768,*, 2019

Stoler, D., Saleh, B., and Teich, M., (1985), "Binomial states of the quantized radiation field", *Optica Acta: International Journal of Optics,* Vol.32, No.3, pp.345–355, 1985

Sudarshan, E. C. G., (1963), "Equivalence of semiclassical and quantum mechanical descriptions of statistical light beams", *Physical Review Letters,* Vol.10, No.7, pp.277, 1963

Susskind, L. and Glogower, J., (1964), "Quantum mechanical phase and time operator", *Physics Physique Fizika,* Vol.1, No.1, pp.49, 1964

Thapliyal, K., Banerjee, S., and Pathak, A., (2016), "Tomograms for open quantum systems: in (finite) dimensional optical and spin systems", *Annals of Physics,* Vol.366,, pp.148–167, 2016

Thapliyal, K., Banerjee, S., Pathak, A., Omkar, S., and Ravishankar, V., (2015), "Quasiprobability distributions in open quantum systems: spin-qubit systems", *Annals of Physics,* Vol.362,, pp.261–286, 2015

Thapliyal, K., Pathak, A., Sen, B., and Peřina, J., (2014a), "Higher-order nonclassicalities in a codirectional nonlinear optical coupler: quantum entanglement, squeezing, and antibunching", *Physical Review A,* Vol.90, No.1, pp.013808, 2014

Thapliyal, K., Pathak, A., Sen, B., and Peřina, J., (2014b), "Nonclassical properties of a contradirectional nonlinear optical coupler", *Physics Letters A,* Vol.378, No.46, pp.3431–3440, 2014

Thapliyal, K., Pathak, A., Sen, B., and Perina, J., (2017a), "Nonclassicality in non-degenerate hyper-Raman processes", *arXiv preprint arXiv:1710.04456,*, 2017

Thapliyal, K. and Perina, J., (2019), "Quasidistribution of phases in Raman process with weak and strong pumps", *arXiv preprint arXiv:1907.06467,*, 2019

Thapliyal, K., Samantray, N. L., Banerji, J., and Pathak, A., (2017b), "Comparison of lower- and higher-order nonclassicality in photon added and subtracted squeezed coherent states", *Physics Letters A,* Vol.381, No.37, pp.3178 – 3187, 2017

Thapliyal, K., Sharma, R. D., and Pathak, A., (2017c), "Protocols for quantum binary voting", *International Journal of Quantum Information,* Vol.15,, pp.1750007, 2017

Torres, J. P., Deyanova, Y., Torner, L., and Molina-Terriza, G., (2003), "Preparation of engineered two-photon entangled states for multidimensional quantum information", *Physical Review A,* Vol.67, No.5, pp.052313, 2003

Usuga, M. A., Müller, C. R., Wittmann, C., Marek, P., Filip, R., Marquardt, C., Leuchs, G., and Andersen, U. L., (2010), "Noise-powered probabilistic concentration of phase information", *Nature Physics,* Vol.6, No.10, pp.767, 2010

Vaccaro, J. and Pegg, D., (1989), "Phase properties of squeezed states of light", *Optics Communications,* Vol.70, No.6, pp.529–534, 1989

Verma, A. and Pathak, A., (2009), "Reduction of quantum phase fluctuations in intermediate states", *Physics Letters A,* Vol.373, No.16, pp.1421–1428, 2009

Verma, A. and Pathak, A., (2010), "Generalized structure of higher order nonclassicality", *Physics Letters A,* Vol.374, No.8, pp.1009–1020, 2010

Verma, A., Sharma, N. K., and Pathak, A., (2008), "Higher order antibunching in intermediate states", *Physics Letters A,* Vol.372, No.34, pp.5542–5551, 2008

Vogel, K., Akulin, V., and Schleich, W., (1993), "Quantum state engineering of the radiation field", *Physical Review Letters,* Vol.71, No.12, pp.1816, 1993

Wang, D., Li, M., Zhu, F., Yin, Z.-Q., Chen, W., Han, Z.-F., Guo, G.-C., and Wang, Q., (2014),

"Quantum key distribution with the single-photon-added coherent source", *Physical Review A,* Vol.90, No.6, pp.062315, 2014

Wei, T.-C., Nemoto, K., Goldbart, P. M., Kwiat, P. G., Munro, W. J., and Verstraete, F., (2003), "Maximal entanglement versus entropy for mixed quantum states", *Physical Review A,* Vol.67, No.2, pp.022110, 2003

Wigner, E. P., (1932), "On the quantum correction for thermodynamic equilibrium", *Physical Review,* Vol.40, No.5, pp.749, 1932

Wunsche, A., (1991), "Displaced Fock states and their connection to quasiprobabilities", *Quantum Optics: Journal of the European Optical Society Part B,* Vol.3, No.6, pp.359, 1991

Xu, F., Qi, B., Ma, X., Xu, H., Zheng, H., and Lo, H.-K., (2012), "Ultrafast quantum random number generation based on quantum phase fluctuations", *Optics Express,* Vol.20, No.11, pp.12366–12377, 2012

Yao, D.-m., (1987), "Phase properties of squeezed states of light", *Physics Letters A,* Vol.122, No.2, pp.77–83, 1987

Yuan, Z., Kardynal, B. E., Stevenson, R. M., Shields, A. J., Lobo, C. J., Cooper, K., Beattie, N. S., Ritchie, D. A., and Pepper, M., (2002), "Electrically driven single-photon source", *Science,* Vol.295, No.5552, pp.102–105, 2002

Zavatta, A., Parigi, V., Kim, M., and Bellini, M., (2008), "Subtracting photons from arbitrary light fields: experimental test of coherent state invariance by single-photon annihilation", *New Journal of Physics,* Vol.10, No.12, pp.123006, 2008

Zavatta, A., Viciani, S., and Bellini, M., (2004), "Quantum-to-classical transition with single-photon-added coherent states of light", *Science,* Vol.306, No.5696, pp.660–662, 2004

Zavatta, A., Viciani, S., and Bellini, M., (2005), "Single-photon excitation of a coherent state: catching the elementary step of stimulated light emission", *Physical Review A,* Vol.72, No.2, pp.023820, 2005

Zheng-Feng, H., (1992), "Fluctuation of phase in the displaced number states", *Journal of Modern Optics,* Vol.39, No.6, pp.1381–1397, 1992

Ziesel, F., Ruster, T., Walther, A., Kaufmann, H., Dawkins, S., Singer, K., Schmidt-Kaler, F., and Poschinger, U., (2013), "Experimental creation and analysis of displaced number states", *Journal of Physics B: Atomic, Molecular and Optical Physics,* Vol.46, No.10, pp.104008, 2013

Zou, X. and Mandel, L., (1990), "Photon-antibunching and sub-Poissonian photon statistics", *Physical Review A,* Vol.41, No.1, pp.475, 1990