

Publications

Included in the Thesis

1. **Shrivastava, K. K.**, Sahu, A., Bhoi, B., Singh, R. (2024). “*Unveiling photon–photon coupling induced transparency and absorption*”. *Journal of Physics D: Applied Physics*, 57(46), 465305.
2. Tiwari, T., **Shrivastava, K. K.**, Roy, D., Singh, R. (2024). “*A Modified Quasi-Classical Analysis to Capture the Effects of Strong Interaction in Open QED Lattices*”. *Annalen der Physik*, 536(5), 2300402.
3. **Shrivastava***, **K. K.**, Ketkar*, M. D., Bhoi, B., Singh, R. (2024). “*Emergence of coupling induced transparency by tuning purely dissipative couplings*”. arXiv preprint arXiv:2409.12577.

Not Included in the Thesis

1. Maurya*, A., **Shrivastava***, **K. K.**, Verma, S., Singh, R., Bhoi, B. (2024). “*Room temperature photon-magnon coupling in YIG-electric field coupled resonator system*”. *Chemical Physics Impact*, 9, 100669.
2. Tunwal*, E., **Shrivastava***, **K. K.**, Nayak, R. K., Kumar, R., Bhattacharyya, S., Singh, R., Bhoi, B. (2025). “*Photon-photon coupling induced bound state in the continuum and transparency*”. arXiv preprint arXiv:2501.00900.
3. Kashid, S. S., Verma, S., Maurya, A., Maity, M., **Shrivastava, K. K.**, Singh, R., Bhoi, B. (2024). “*Unveiling Magnon-Magnon Coupling and Its Dynamic Control in Nanomagnets*”. arXiv preprint arXiv:2412.11181.
4. Verma, S., Maurya, A., Khan, F., **Shrivastava, K. K.**, Singh, R., Bhoi, B. (2025). “*Hybrid Photon-magnon Systems: Exploring the Purcell Effect*”. arXiv preprint arXiv:2501.04574.
5. **Shrivastava, K. K.**, Arpan, Ketkar, M. D., Bhoi, B., Singh, R. “*Bloch-Siegert like shift in ultrastrong Photon-Magnon Coupling at room temperature*”. manuscript under preparation...
6. Ketkar*, M. D., **Shrivastava***, **K. K.**, Maurya, A., Bhoi, B., Singh, R. “*Proximity driven photon-tunneling in Chiral Quantum Hybrid Systems*”. manuscript under preparation...
7. **Shrivastava, K. K.**, Krithika, V., Vrunda, Bhoi, B., Singh, R. “*Unveiling quantum interference in hybrid Photon-Magnon systems*”. manuscript under preparation...
8. Nayak, R. K., **Shrivastava***, **K. K.**, Maurya, A., Bhoi, B., Singh, R. “*Unveiling dielectric dependent coupling induced transparency in photon-photon systems*”. manuscript under preparation...

References

- E. Akkermans and G. Montambaux. *Mesoscopic Physics of Electrons and Photons*. Cambridge University Press, 2007. doi: 10.1017/CBO9780511618833.
- T. Aoki, A. S. Parkins, D. J. Alton, C. A. Regal, B. Dayan, E. Ostby, K. J. Vahala, and H. J. Kimble. Efficient routing of single photons by one atom and a microtoroidal cavity. *Phys. Rev. Lett.*, 102:083601, Feb 2009. doi: 10.1103/PhysRevLett.102.083601. URL <https://link.aps.org/doi/10.1103/PhysRevLett.102.083601>.
- O. Astafiev, A. M. Zagoskin, A. A. Abdumalikov, Y. A. Pashkin, T. Yamamoto, K. Inomata, Y. Nakamura, and J. S. Tsai. Resonance fluorescence of a single artificial atom. *Science*, 327(5967):840–843, 2010. ISSN 0036-8075. doi: 10.1126/science.1181918. URL <https://science.sciencemag.org/content/327/5967/840>.
- N. Bernier, L. Tóth, A. Feofanov, and T. Kippenberg. Level attraction in a microwave optomechanical circuit. *Physical Review A*, 98(2):023841, 2018.
- B. Bhoi, B. Kim, H.-C. Jeon, and S.-K. Kim. Coupling-induced transparency and absorption in a magnon–multiphoton hybrid system. *Journal of Applied Physics*, 132(24), 2022.
- D. Brazhnikov, A. Tumaikin, V. Yudin, and A. Taichenachev. Electromagnetically induced absorption and transparency in magneto-optical resonances in an elliptically polarized field. *JOSA B*, 22(1):57–64, 2005.
- T. Caneva, M. T. Manzoni, T. Shi, J. S. Douglas, J. I. Cirac, and D. E. Chang. Quantum dynamics of propagating photons with strong interactions: a generalized input–output formalism. *New J. Phys.*, 17(11):113001, oct 2015. doi: 10.1088/1367-2630/17/11/113001. URL <https://doi.org/10.1088%2F1367-2630%2F17%2F11%2F113001>.
- M. Cao, T. Wang, H. Zhang, and Y. Zhang. Tunable electromagnetically induced absorption based on graphene. *Optics Communications*, 413:73–79, 2018.
- S. Fan, S. E. Kocabas, and J.-T. Shen. Input-output formalism for few-photon transport in one-dimensional nanophotonic waveguides coupled to a qubit. *Phys. Rev. A*, 82:063821, Dec 2010. doi: 10.1103/PhysRevA.82.063821. URL <https://link.aps.org/doi/10.1103/PhysRevA.82.063821>.
- Y.-L. L. Fang and H. U. Baranger. Waveguide qed: Power spectra and correlations of two photons scattered off multiple distant qubits and a mirror. *Phys. Rev. A*, 91:053845, May 2015. doi: 10.1103/PhysRevA.91.053845. URL <https://link.aps.org/doi/10.1103/PhysRevA.91.053845>.

- O. Firstenberg, T. Peyronel, Q.-Y. Liang, A. V. Gorshkov, M. D. Lukin, and V. Vuletić. Attractive photons in a quantum nonlinear medium. *Nature*, 502(7469):71–75, Oct 2013. ISSN 1476-4687. doi: 10.1038/nature12512. URL <https://doi.org/10.1038/nature12512>.
- M. Fitzpatrick, N. M. Sundaresan, A. C. Y. Li, J. Koch, and A. A. Houck. Observation of a dissipative phase transition in a one-dimensional circuit qed lattice. *Phys. Rev. X*, 7: 011016, Feb 2017. doi: 10.1103/PhysRevX.7.011016. URL <https://link.aps.org/doi/10.1103/PhysRevX.7.011016>.
- M. Fleischhauer, A. Imamoglu, and J. P. Marangos. Electromagnetically induced transparency: Optics in coherent media. *Reviews of modern physics*, 77(2):633–673, 2005.
- S. M. Girvin, M. H. Devoret, and R. J. Schoelkopf. Circuit QED and engineering charge-based superconducting qubits. *Phys. Scr.*, T137:014012, dec 2009. doi: 10.1088/0031-8949/2009/t137/014012. URL <https://doi.org/10.1088/0031-8949/2009/t137/014012>.
- X. Gu, A. F. Kockum, A. Miranowicz, Y. xi Liu, and F. Nori. Microwave photonics with superconducting quantum circuits. *Phys. Rep.*, 718-719:1 – 102, 2017. ISSN 0370-1573. doi: <https://doi.org/10.1016/j.physrep.2017.10.002>. URL <http://www.sciencedirect.com/science/article/pii/S0370157317303290>.
- M. Harder, L. Bai, P. Hyde, and C.-M. Hu. Topological properties of a coupled spin-photon system induced by damping. *Physical Review B*, 95(21):214411, 2017.
- M. Harder, B. Yao, Y. Gui, and C.-M. Hu. Coherent and dissipative cavity magnonics. *Journal of Applied Physics*, 129(20), 2021.
- S. E. Harris, J. Field, and A. Imamoglu. Nonlinear optical processes using electromagnetically induced transparency. *Physical Review Letters*, 64(10):1107, 1990.
- M. J. Hartmann. Quantum simulation with interacting photons. *J. Opt.*, 18(10):104005, sep 2016. doi: 10.1088/2040-8978/18/10/104005. URL <https://doi.org/10.1088/2040-8978/18/10/104005>.
- I.-C. Hoi, C. M. Wilson, G. Johansson, T. Palomaki, B. Peropadre, and P. Delsing. *Phys. Rev. Lett.*, 107:073601, Aug 2011. doi: 10.1103/PhysRevLett.107.073601. URL <https://link.aps.org/doi/10.1103/PhysRevLett.107.073601>.
- M.-W. Hu, W. Yu, and Y.-P. Wang. Auxiliary mode mediated coherent and complex couplings in a cavity magnonic system. *Annalen der Physik*, 534(4):2100534, 2022.
- S. S. Kashid, S. Verma, A. Maurya, M. Maity, K. K. Shrivastava, R. Singh, and B. Bhoi. Unveiling magnon-magnon coupling and its dynamic control in nanomagnets. *arXiv preprint arXiv:2412.11181*, 2024.
- D. Kilda and J. Keeling. Fluorescence spectrum and thermalization in a driven coupled cavity array. *Physical Review Letters*, 122(4):043602, 2019.
- H. J. Kimble. The quantum internet. *Nature*, 453(7198):1023–1030, 2008.

- A. J. Kollár, M. Fitzpatrick, and A. A. Houck. Hyperbolic lattices in circuit quantum electrodynamics. *Nature*, 571(7763):45–50, Jul 2019. ISSN 1476-4687. doi: 10.1038/s41586-019-1348-3. URL <https://doi.org/10.1038/s41586-019-1348-3>.
- K. Koshino and Y. Nakamura. Control of the radiative level shift and linewidth of a superconducting artificial atom through a variable boundary condition. *New J. Phys.*, 14(4):043005, apr 2012. doi: 10.1088/1367-2630/14/4/043005. URL <https://doi.org/10.1088/1367-2630/14/4/043005>.
- K. Lalumière, B. C. Sanders, A. F. van Loo, A. Fedorov, A. Wallraff, and A. Blais. Input-output theory for waveguide qed with an ensemble of inhomogeneous atoms. *Phys. Rev. A*, 88:043806, Oct 2013. doi: 10.1103/PhysRevA.88.043806. URL <https://link.aps.org/doi/10.1103/PhysRevA.88.043806>.
- K. Le Hur, L. Henriët, A. Petrescu, K. Plekhanov, G. Roux, and M. Schiró. Many-body quantum electrodynamics networks: Non-equilibrium condensed matter physics with light. *Comp. Ren. Phys.*, 17(8):808 – 835, 2016. ISSN 1631-0705. doi: <https://doi.org/10.1016/j.crhy.2016.05.003>. URL <http://www.sciencedirect.com/science/article/pii/S1631070516300317>.
- A. Lezama, S. Barreiro, and A. Akulshin. Electromagnetically induced absorption. *Physical Review A*, 59(6):4732, 1999.
- A. C. Y. Li, F. Petruccione, and J. Koch. Perturbative approach to markovian open quantum systems. *Sci. Rep.*, 4(1):4887, May 2014. ISSN 2045-2322. doi: 10.1038/srep04887. URL <https://doi.org/10.1038/srep04887>.
- A. C. Y. Li, F. Petruccione, and J. Koch. Resummation for nonequilibrium perturbation theory and application to open quantum lattices. *Phys. Rev. X*, 6:021037, Jun 2016. doi: 10.1103/PhysRevX.6.021037. URL <https://link.aps.org/doi/10.1103/PhysRevX.6.021037>.
- Y. Li, W. Zhang, V. Tyberkevych, W.-K. Kwok, A. Hoffmann, and V. Novosad. Hybrid magnonics: Physics, circuits, and applications for coherent information processing. *Journal of Applied Physics*, 128(13), 2020.
- Y. Li, V. G. Yefremenko, M. Lisovenko, C. Trevillian, T. Polakovic, T. W. Cecil, P. S. Barry, J. Pearson, R. Divan, V. Tyberkevych, et al. Coherent coupling of two remote magnonic resonators mediated by superconducting circuits. *Physical Review Letters*, 128(4):047701, 2022.
- Z. Li, Y. Ma, R. Huang, R. Singh, J. Gu, Z. Tian, J. Han, and W. Zhang. Manipulating the plasmon-induced transparency in terahertz metamaterials. *Optics express*, 19(9):8912–8919, 2011.
- J.-Q. Liao and C. K. Law. Correlated two-photon transport in a one-dimensional waveguide side-coupled to a nonlinear cavity. *Phys. Rev. A*, 82:053836, Nov 2010. doi: 10.1103/PhysRevA.82.053836. URL <https://link.aps.org/doi/10.1103/PhysRevA.82.053836>.
- P. Longo, P. Schmitteckert, and K. Busch. Few-photon transport in low-dimensional systems: Interaction-induced radiation trapping. *Phys. Rev. Lett.*, 104:023602, Jan 2010. doi: 10.1103/PhysRevLett.104.023602. URL <https://link.aps.org/doi/10.1103/PhysRevLett.104.023602>.

- Y. Lv, D.-D. Zhu, Y.-J. Yin, and H.-F. Zhang. Broadband electromagnetically induced transparency to broadband electromagnetically induced absorption conversion with silicon based on metastructure. *Photonics and Nanostructures-Fundamentals and Applications*, 55:101136, 2023.
- A. I. Lvovsky, B. C. Sanders, and W. Tittel. Optical quantum memory. *Nature photonics*, 3(12):706–714, 2009.
- L. Ma, O. Slattery, and X. Tang. Optical quantum memory based on electromagnetically induced transparency. *Journal of Optics*, 19(4):043001, 2017.
- R. Ma, B. Saxberg, C. Owens, N. Leung, Y. Lu, J. Simon, and D. I. Schuster. A dissipatively stabilized mott insulator of photons. *Nature*, 566(7742):51–57, Feb 2019. ISSN 1476-4687. doi: 10.1038/s41586-019-0897-9. URL <https://doi.org/10.1038/s41586-019-0897-9>.
- P. Manasi and D. Roy. Light propagation through one-dimensional interacting open quantum systems. *Phys. Rev. A*, 98:023802, Aug 2018. doi: 10.1103/PhysRevA.98.023802. URL <https://link.aps.org/doi/10.1103/PhysRevA.98.023802>.
- A. Maurya, K. K. Shrivastava, S. Verma, R. Singh, and B. Bhoi. Room temperature photon-magnon coupling in yig-electric field coupled resonator system. *Chemical Physics Impact*, 9:100669, 2024.
- Z. Meir, O. Schwartz, E. Shahmoon, D. Oron, and R. Ozeri. Cooperative lamb shift in a mesoscopic atomic array. *Phys. Rev. Lett.*, 113:193002, Nov 2014. doi: 10.1103/PhysRevLett.113.193002. URL <https://link.aps.org/doi/10.1103/PhysRevLett.113.193002>.
- A. Metelmann and A. Clerk. Quantum-limited amplification via reservoir engineering. *Physical review letters*, 112(13):133904, 2014.
- N. Moiseyev. *Non-Hermitian quantum mechanics*. Cambridge University Press, 2011.
- U. Naether, F. Quijandría, J. J. García-Ripoll, and D. Zueco. Stationary discrete solitons in a driven dissipative bose-hubbard chain. *Phys. Rev. A*, 91:033823, Mar 2015a. doi: 10.1103/PhysRevA.91.033823. URL <https://link.aps.org/doi/10.1103/PhysRevA.91.033823>.
- U. Naether, F. Quijandría, J. J. García-Ripoll, and D. Zueco. Stationary discrete solitons in a driven dissipative bose-hubbard chain. *Phys. Rev. A*, 91:033823, Mar 2015b. doi: 10.1103/PhysRevA.91.033823. URL <https://link.aps.org/doi/10.1103/PhysRevA.91.033823>.
- R. Ning, J. Bao, Z. Chen, and Z. Jiao. Electromagnetically induced absorption in metamaterials and applications in the infrared range. *Journal of Electronic Materials*, 48:4733–4739, 2019.
- C. Noh and D. G. Angelakis. Quantum simulations and many-body physics with light. *Rep. Prog. Phys.*, 80(1):016401, nov 2016. doi: 10.1088/0034-4885/80/1/016401. URL <https://doi.org/10.1088/0034-4885/80/1/016401>.
- T. Orell, A. A. Michailidis, M. Serbyn, and M. Silveri. Probing the many-body localization phase transition with superconducting circuits. *Phys. Rev. B*, 100:134504, Oct 2019. doi: 10.1103/PhysRevB.100.134504. URL <https://link.aps.org/doi/10.1103/PhysRevB.100.134504>.

- A. Pal and D. A. Huse. Many-body localization phase transition. *Phys. Rev. B*, 82:174411, Nov 2010. doi: 10.1103/PhysRevB.82.174411. URL <https://link.aps.org/doi/10.1103/PhysRevB.82.174411>.
- T. Peyronel, O. Firstenberg, Q.-Y. Liang, S. Hofferberth, A. V. Gorshkov, T. Pohl, M. D. Lukin, and V. Vuletić. Quantum nonlinear optics with single photons enabled by strongly interacting atoms. *Nature*, 488(7409):57–60, Aug 2012. ISSN 1476-4687. doi: 10.1038/nature11361. URL <https://doi.org/10.1038/nature11361>.
- D. M. Pozar. *Microwave engineering: theory and techniques*. John wiley & sons, 2021.
- J. Raftery, D. Sadri, S. Schmidt, H. E. Türeci, and A. A. Houck. Observation of a dissipation-induced classical to quantum transition. *Phys. Rev. X*, 4:031043, Sep 2014. doi: 10.1103/PhysRevX.4.031043. URL <https://link.aps.org/doi/10.1103/PhysRevX.4.031043>.
- J. Rao, Y. Wang, Y. Yang, T. Yu, Y. Gui, X. Fan, D. Xue, and C.-M. Hu. Interactions between a magnon mode and a cavity photon mode mediated by traveling photons. *Physical Review B*, 101(6):064404, 2020.
- J. Rao, P. Xu, Y. Gui, Y. Wang, Y. Yang, B. Yao, J. Dietrich, G. Bridges, X. Fan, D. Xue, et al. Interferometric control of magnon-induced nearly perfect absorption in cavity magnonics. *Nature communications*, 12(1):1933, 2021a.
- J. Rao, Y. Zhao, Y. Gui, X. Fan, D. Xue, and C.-M. Hu. Controlling microwaves in non-hermitian metamaterials. *Physical Review Applied*, 15(2):L021003, 2021b.
- D. Roy. Few-photon optical diode. *Phys. Rev. B*, 81:155117, Apr 2010. doi: 10.1103/PhysRevB.81.155117. URL <https://link.aps.org/doi/10.1103/PhysRevB.81.155117>.
- D. Roy. Correlated few-photon transport in one-dimensional waveguides: Linear and nonlinear dispersions. *Phys. Rev. A*, 83:043823, Apr 2011. doi: 10.1103/PhysRevA.83.043823. URL <https://link.aps.org/doi/10.1103/PhysRevA.83.043823>.
- D. Roy. Cascaded two-photon nonlinearity in a one-dimensional waveguide with multiple two-level emitters. *Sci. Rep.*, 3(1):2337, Aug 2013. ISSN 2045-2322. doi: 10.1038/srep02337. URL <https://doi.org/10.1038/srep02337>.
- D. Roy. Critical features of nonlinear optical isolators for improved nonreciprocity. *Phys. Rev. A*, 96:033838, Sep 2017. doi: 10.1103/PhysRevA.96.033838. URL <https://link.aps.org/doi/10.1103/PhysRevA.96.033838>.
- D. Roy, R. Singh, and R. Moessner. Probing many-body localization by spin noise spectroscopy. *Phys. Rev. B*, 92:180205, Nov 2015. doi: 10.1103/PhysRevB.92.180205. URL <https://link.aps.org/doi/10.1103/PhysRevB.92.180205>.
- D. Roy, C. M. Wilson, and O. Firstenberg. Colloquium: Strongly interacting photons in one-dimensional continuum. *Rev. Mod. Phys.*, 89:021001, May 2017. doi: 10.1103/RevModPhys.89.021001. URL <https://link.aps.org/doi/10.1103/RevModPhys.89.021001>.
- E. Sanchez-Burillo, D. Zueco, J. J. Garcia-Ripoll, and L. Martin-Moreno. Scattering in the ultrastrong regime: Nonlinear optics with one photon. *Phys. Rev. Lett.*, 113:263604, Dec 2014. doi: 10.1103/PhysRevLett.113.263604. URL <https://link.aps.org/doi/10.1103/PhysRevLett.113.263604>.

- S. Schmidt and J. Koch. Circuit qed lattices: Towards quantum simulation with superconducting circuits. *Ann. der Phys.*, 525(6):395–412, 2013. doi: 10.1002/andp.201200261. URL <https://onlinelibrary.wiley.com/doi/abs/10.1002/andp.201200261>.
- M. O. Scully and M. S. Zubairy. *Quantum optics*. Cambridge university press, 1997a.
- M. O. Scully and M. S. Zubairy. *Quantum Optics*. Cambridge University Press, 1997b. doi: 10.1017/CBO9780511813993.
- T. F. See, V. M. Bastidas, J. Tangpanitanon, and D. G. Angelakis. Strongly correlated photon transport in nonlinear photonic lattices with disorder: Probing signatures of the localization transition. *Phys. Rev. A*, 99:033835, Mar 2019. doi: 10.1103/PhysRevA.99.033835. URL <https://link.aps.org/doi/10.1103/PhysRevA.99.033835>.
- J.-T. Shen and S. Fan. Strongly correlated multiparticle transport in one dimension through a quantum impurity. *Phys. Rev. A*, 76:062709, Dec 2007. doi: 10.1103/PhysRevA.76.062709. URL <https://link.aps.org/doi/10.1103/PhysRevA.76.062709>.
- X. Shi, Z. H. Xue, Q. Zhang, and L. Si. Miniaturized terahertz stretchable electromagnetically induced transparency based on spoof surface plasmon polaritons. *Optics Communications*, 528:129028, 2023.
- K. K. Shrivastava, M. D. Ketkar, B. Bhoi, and R. Singh. Emergence of coupling induced transparency by tuning purely dissipative couplings. *arXiv preprint arXiv:2409.12577*, 2024a.
- K. K. Shrivastava, A. Sahu, B. Bhoi, and R. Singh. Unveiling photon-photon coupling induced transparency and absorption. *Journal of Physics D: Applied Physics*, 2024b.
- R. Singh and E. Shimshoni. Localization due to interaction-enhanced disorder in bosonic systems. *Ann. der Phys.*, 529(7):1600309, 2017. doi: 10.1002/andp.201600309. URL <https://onlinelibrary.wiley.com/doi/abs/10.1002/andp.201600309>.
- Y.-Z. Sun, C.-J. Gao, J. Qu, and H.-F. Zhang. Circularly polarized manipulations with vo₂-doped dielectric electromagnetically induced transparency and absorption. *Annalen der Physik*, 534(6):2200130, 2022.
- T. Tiwari, K. K. Shrivastava, D. Roy, and R. Singh. A modified quasi-classical analysis to capture the effects of strong interaction in open qed lattices. *Annalen der Physik*, 536(5):2300402, 2024.
- E. Tunwal, K. K. Shrivastava, R. K. Nayak, R. Kumar, S. Bhattacharyya, R. Singh, and B. Bhoi. Photon-photon coupling induced bound state in the continuum and transparency. *arXiv preprint arXiv:2501.00900*, 2025.
- D. L. Underwood, W. E. Shanks, J. Koch, and A. A. Houck. Low-disorder microwave cavity lattices for quantum simulation with photons. *Phys. Rev. A*, 86:023837, Aug 2012. doi: 10.1103/PhysRevA.86.023837. URL <https://link.aps.org/doi/10.1103/PhysRevA.86.023837>.
- A. F. van Loo, A. Fedorov, K. Lalumière, B. C. Sanders, A. Blais, and A. Wallraff. Photon-mediated interactions between distant artificial atoms. *Science*, 342(6165):1494–1496, 2013. doi: 10.1126/science.1244324. URL <https://www.science.org/doi/abs/10.1126/science.1244324>.

- S. Verma, A. Maurya, F. Khan, K. K. Srivastava, R. Singh, and B. Bhoi. Hybrid photon-magnon systems: Exploring the purcell effect. *arXiv preprint arXiv:2501.04574*, 2025.
- D. Walls and G. J. Milburn. Quantum information. In *Quantum Optics*, pages 307–346. Springer, 2008.
- H. Walther, B. T. H. Varcoe, B.-G. Englert, and T. Becker. Cavity quantum electrodynamics. *Rep. Prog. Phys.*, 69(5):1325–1382, apr 2006. doi: 10.1088/0034-4885/69/5/r02. URL <https://doi.org/10.1088%2F0034-4885%2F69%2F5%2Fr02>.
- S.-H. Wei, B. Jing, X.-Y. Zhang, J.-Y. Liao, C.-Z. Yuan, B.-Y. Fan, C. Lyu, D.-L. Zhou, Y. Wang, G.-W. Deng, et al. Towards real-world quantum networks: a review. *Laser & Photonics Reviews*, 16(3):2100219, 2022.
- J. Wolters, A. W. Schell, G. Kewes, N. Nüsse, M. Schoengen, H. Döscher, T. Hannappel, B. Löchel, M. Barth, and O. Benson. *App. Phys. Lett.*, 97(14), 2010. URL <https://doi.org/10.1063/1.3499300>.
- Z.-L. Xiang, S. Ashhab, J. You, and F. Nori. Hybrid quantum circuits: Superconducting circuits interacting with other quantum systems. *Reviews of Modern Physics*, 85(2):623–653, 2013.
- S. Xu, E. Rephaeli, and S. Fan. Analytic properties of two-photon scattering matrix in integrated quantum systems determined by the cluster decomposition principle. *Phys. Rev. Lett.*, 111:223602, Nov 2013. doi: 10.1103/PhysRevLett.111.223602. URL <https://link.aps.org/doi/10.1103/PhysRevLett.111.223602>.
- V. I. Yudson and P. Reineker. Multiphoton scattering in a one-dimensional waveguide with resonant atoms. *Phys. Rev. A*, 78:052713, Nov 2008. doi: 10.1103/PhysRevA.78.052713. URL <https://link.aps.org/doi/10.1103/PhysRevA.78.052713>.
- V. I. Yudson and P. Reineker. Quantum optics in waveguides with resonant atoms: Multi-photon scattering. *Opt. Spec.*, 108(3):362–369, Mar. 2010. doi: 10.1134/S0030400X10030082.
- L. Zhang, S. Mei, K. Huang, and C.-W. Qiu. Advances in full control of electromagnetic waves with metasurfaces. *Advanced Optical Materials*, 4(6):818–833, 2016.
- H. Zheng, D. J. Gauthier, and H. U. Baranger. Waveguide qed: Many-body bound-state effects in coherent and fock-state scattering from a two-level system. *Phys. Rev. A*, 82:063816, Dec 2010. doi: 10.1103/PhysRevA.82.063816. URL <https://link.aps.org/doi/10.1103/PhysRevA.82.063816>.
- T. Zheng, P. Wang, B. Wei, B. Lu, B. Cao, and F. Lei. Three-pathway electromagnetically induced transparency and absorption based on coupled superconducting resonators. *Physical Review A*, 108(5):053105, 2023.