Ziwen Pan

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Ph.D., Electrical & Computer Engineering, University of Arizona, Tucson **2017.08 – 2022.05**

EXPERIENCE

***Wireless System Applications Engineer*, Litepoint, Teradyne** **2022.05 – 2024.08**

Using C++, Python, SCPI and other programming languages, work in Silicon Solutions team with a focus on developing automatic testing solutions for Qualcomm chipsets on wireless communications, including but not limited to WiFi, Bluetooth, GPS, etc.

WiFi:

- Using C++, working on IQFact+ solution on Dut Control, testing extension functions and IQMeasure level for Qualcomm chipset testing regarding mainly 11be and other legacy standards. Test case including DL-OFDMA MRU, preamble puncturing, regular TX/RX/XTAL calibration.
- Using Python, working with LitePoint MW7G and MX tester SCPI level and TFC level operation on 11be standard.
- Proficient with Qualcomm tools in QDART, eg, using QSPR to run WiFi test tree, using QRCT to run manual testing, using ToneWizard to configure preamble puncturing/MRU tone plan.

Bluetooth:

- Using Python, working with Channel sounding testing on Qualcomm chipset regarding Stable Phase, Frequency verification, Phase Measurement Accuracy, Modulation Spectrum testing on LitePoint MW7G tester on SCPI level.

***Research Assistant*, University of Arizona** **2017.08 – 2022.05**

Project: Entanglement-assisted communication without a phase reference **2021.01 – 2022.05**

- Using MATLAB and Mathematica, calculated and compared the phase estimation variance with max Van Trees information and max Fisher information method, exploring the communication rate that exceeded the classical cases for a few given receiver models and analyzing the improvement through an adaptive scheme.

Project: Secret Key Distillation over Free Space Channel [J1] [J2] [J3] [J6] [J7] **2017.08 – 2020.12**

- Using MATLAB and Mathematica, established the mathematic model of "Restricted Eavesdropping" and calculated the lower bound and upper bound on the secure key rate within this model utilizing the Hashing inequality and the relative entropy of entanglement respectively, obtaining capacity for some certain channel conditions.
- Using MATLAB and Mathematica, calculated the lower and upper bound of secure key rate in the Restricted Eavesdropping model over a free-space optics channel where the eavesdropper is right beside the communication parties, and analyzed the "exclusion zone" as one of the communication parities' defense strategies.
- Using MATLAB, simulated free space optical transmission with occlusion in path and optimized the eavesdropper's power collecting strategy by optimizing her receiver aperture's position.

Project: FPGA based Burst-Error Performance Analysis and Optimization on LDPC Codes [J8] **2020.07 – 09**

- Using Verilog, with real-time FPGA-based LDPC transmission, adapted signal power level to simulate the burst-error modes, and compared BER performance with different intra-codeword interleaving schemes for LDPC codeword generated and decoded on the FPGA-based encoders and decoders under the burst error scenario.

JOURNAL PUBLICATIONS

[J1] Pan, Ziwen, Kaushik P. Seshadreesan, William Clark, Mark R. Adcock, Ivan B. Djordjevic, Jeffrey H. Shapiro, and Saikat Guha. "Secret-key distillation across a quantum wiretap channel under restricted eavesdropping." Physical Review Applied 14, no. 2 (2020): 024044.

[J2] Pan, Ziwen, and Ivan B. Djordjevic. "Secret key distillation over satellite-to-satellite free-space optics channel with a limited-sized aperture eavesdropper in the same plane of the legitimate receiver." Optics Express 28, no. 25 (2020): 37129-37148.

[J3] Pan, Ziwen, and Ivan B. Djordjevic. "Exclusion zone analysis on secret key distillation over a realistic satellite-to-satellite free-space channel." Journal of Optical Communications and Networking 14, no. 10 (2022): 771-779.

[J4] Cai, Kang, **Zi-Wen Pan**, Rui-Xia Wang, Dong Ruan, Zhang-Qi Yin, and Gui-Lu Long. "Single phonon source based on a giant polariton nonlinear effect." Optics Letters 43, no. 5 (2018): 1163-1166.

[J5] Pan, Ziwen, Jiarui Cai, and Chuan Wang. "Quantum key distribution with high order fibonacci-like orbital angular momentum states." International Journal of Theoretical Physics 56, no. 8 (2017): 2622-2634.

[J6] Pan, Ziwen, and Ivan B. Djordjevic. "Geometrical optics restricted eavesdropping analysis of satellite-to-satellite secret key distillation." (invited), special issue "Physical-Layer Security, Quantum Key Distribution and Post-quantum Cryptography", Entropy. 2021; 23(8):950.

[J7] Pan, Ziwen, and Ivan B. Djordjevic. "An overview of geometrical optics restricted quantum key distribution." (invited), special issue "Entropies, Divergences, Information, Identities and Inequalities", Entropy 2021, 23(8), 1003.

[J8] Yang, Mingwei, **Ziwen Pan**, and Ivan B. Djordjevic. "FPGA-based burst-error performance analysis and optimization of regular and irregular SD-LDPC codes for 50G-PON and beyond." Optics Express 31, no. 6 (2023): 10936-10946.

[J9] Cai, Jiarui, **Ziwen Pan**, Tie-Jun Wang, Sihai Wang, and Chuan Wang. "High-capacity quantum secure direct communication using hyper-entanglement of photonic qubits." International Journal of Quantum Information 14, no. 08 (2016): 1650043.

Journals Reviewer: IEEE Transactions on Communications, IEEE Transactions on Circuits and Systems II, IEEE/OSA Journal of Lightwave Technology, OSA/IEEE Journal of Optical Communications and Networking, OSA Optics Letters, OSA Optics Express, IEEE Photonics Journal.

CONFERENCE PAPERS

[C1] Pan, Ziwen, John Gariano, William Clark, and Ivan B. Djordjevic. "Secret key distillation over realistic satellite-to-satellite free-space channel." In Quantum 2.0 (pp. QTh7B-15). *Optical Society of America*: Washington, DC, USA, 2020; poster presentation.

[C2] Pan, Ziwen, John Gariano, and Ivan B. Djordjevic. "Secret key distillation over satellite-to-satellite free-space channel with eavesdropper dynamic positioning." In Signal Processing in Photonic Communications, pp. SpTu3I-4. *Optical Society of America* Advanced Photonics Congress: Washington, DC, USA, 2020; oral presentation.

[C3] Pan, Ziwen, and Ivan B. Djordjevic. "Security of satellite-based cv-qkd under realistic assumptions." In 2020 22nd International Conference on Transparent Optical Networks (ICTON), pp. 1-4. *IEEE*, Bari, Italy, 19–23 July 2020; oral presentation.

[C4] Pan, Ziwen, Kaushik P. Seshadreesan, William Clark, Mark R. Adcock, Ivan B. Djordjevic, Jeffrey H. Shapiro, and Saikat Guha. "Secret key distillation over a pure loss quantum wiretap channel under restricted eavesdropping." In 2019 *IEEE International Symposium on Information Theory*, ISIT 2019, pp. 3032-3036. Institute of Electrical and Electronics Engineers Inc., 2019, oral presentation, Paris, France.

[C5] Jiarui Cai, **Ziwen Pan**, Zhiwei Yu, Sihai Wang and Chuan Wang. "Fabrication and characterization of Erbium-doped silica microtoroid". Physics Experimentation 1 (2016): pp. 1-5 (in Chinese), in 12th National college level seminar on educational physics experimental demonstration, poster presentation in Suzhou, China, Oct. 2015.