

Quantum Noise Extraction from the Interference of Laser

Y KUROCHKIN^{1,2}, V SHAROGLAZOVA³, A FEDOROV⁴, A UDALTSOV¹, D SYCH¹, AND R SHAKHOVOY¹

¹*NTI center of Quantum Communications, National University of Science and Technology 'MISIS', Moscow, Russia*

²*Quantum communications, TII, Abu Dhabi, United Arab Emirates*

³*Quantum communication group, Russian Quantum Center, Moscow, Russia*

⁴*Quantum Information Technologies, Russian Quantum Center, Moscow, Russia*

Contact Email: y.kurochkin@gmail.com

We present a method for quantum noise extraction from the interference of laser pulses with random phase. Our technique is based on the calculation of a parameter, which we called the quantum reduction factor, and which allows for the determination of the contributions of quantum and classical noises with the assumption that classical fluctuations exhibit Gaussian distribution. To the best of our knowledge, the concept of quantum reduction factor is introduced for the first time. We demonstrate quantum random number generator with the random bit generation rate of 2 Gbps [1]. To achieve this rate without high computational power we propose a method to extract quantum noise without digital post-processing. Quantum random number generator can be simplified replacing digital post-processing with analog post-selection.

References

- [1] R Shakhovoy, D Sych, V Sharoglazova, A Udaltsov, A Fedorov and Y Kurochkin, *Opt. Express* **28**, 6209 (2020)