Towards useful photonic quantum information processors

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Quantum computing has been attracted a lot of attention due to the potential applications in many area. By utilizing qubits which can have quantum superposition and entanglement, quantum computers can solve problems those are intractable with classical computers. Yet, it seems undesirable to implement a fully working quantum computer near in the near future. On the other hand, rapid development of noisy intermediate-scale quantum (NISQ) computers opens a new avenue to find practical applications using those imperfect devices with hands. In this talk, I will introduce basic principle of quantum computers and how they can outperform classical computers. Then, as a representative NISQ application, I will present variational quantum algorithms (VQAs). I will also present the experimental effort to implement VQAs using photonics and other physical platforms.