

Nomination Statement:

Nomination Statement for paper “Securing Reset Operations in NISQ Quantum Computers”.

I am pleased to nominate the outstanding work by Mi et al. for the NSA's Best Science of Cybersecurity paper competition. Their research, which was published at the Conference on Computer and Communications Security (CCS) in November 2022. As quantum computing becomes increasingly important in fields such as scientific research, drug discovery, finance, and machine learning, the need for secure and robust quantum computing infrastructures has become paramount. Mi et al.'s work is a major step forward in this direction, providing a secure reset operation that enables faster quantum computation and eliminates information leakage.

One of the key contributions of Mi et al.'s work is the development of a secure reset operation, which enables qubits to be re-initialized much faster than thermalization, thus allowing for faster quantum computation. Their approach is based on the well-established principle of confusion, which effectively confuses potential adversaries by introducing a randomized sequence of reset operations. This innovative solution is both simple and effective, and requires no hardware modifications to existing quantum computers, making it a practical solution that can be adopted today. The potential economic benefits and security implications of this work are significant, as the quantum computing industry is expected to reach a value of several billion dollars in the coming years. Mi et al.'s paper represents a major step forward in the field of quantum computer security, and their approach to secure reset will undoubtedly pave the way for further advances in the field. I strongly believe that this work deserves recognition and commendation, and I urge the NSA to consider it for the Best Science of Cybersecurity paper competition.