

Quantum Computing Algorithms for Deterministic Neutron Transport

PI: Brian Kiedrowski, Univ.
of Michigan

Collaborators: Andrew Childs, Univ. of Maryland

Program: Strategic Needs
Blue Sky

ABSTRACT:

This project will develop algorithms for solving the k -eigenvalue form of the neutron diffusion equation and self-adjoint angular flux form of the neutron transport equation in a nuclear reactor physics context on a quantum computer. These methods will employ high-precision quantum linear system algorithms. The asymptotic scaling of the algorithms will be analyzed. Investigation into implementation will be made by making resource estimates by synthesizing explicit circuits for the algorithms, and be studied by emulation on a classical computer.