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NISQ Applications on Trapped Ion Quantum Computers

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Trapped ions are a promising technology for large scale quantum computation. They exhibit long coherence times and have been used to demonstrate world record gate fidelities. We routinely trap linear chains of tens of ions and two- dimensional crystals of hundreds of ions. While there are myriad engineering challenges to surmount to scale up to full control over many ions for circuit based quantum computing, the Noisy Intermediate-Scale Quantum (NISQ) systems which already exist present other computational opportunities. In this talk, I will describe various efforts at GTRI toward the development of trapped ion quantum computers, including a new project to realize trapped ion hardware tailored for combinatorial optimization.