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Quantum Logic Programming

S&T Campaign: Computational Sciences
Computing Sciences

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Research Objective

- Development of high-level quantum programming language based on mathematical logic
- Formal verification of quantum communication protocols using quantum logic.
- Enrich the language with types
- Utilize the nascent field of homotopy type theory.

ARL Facilities and Capabilities Available to Support Collaborative Research

- The high performance computers available allow for simulation of substantial quantum systems.
- Researchers in experimental, and theoretical physics, mathematics, information theory, and computer science working collaboratively.

Challenges

- **Describing composite systems in quantum logic.**
- Development of suitable theorem prover for interpreting the language constructs

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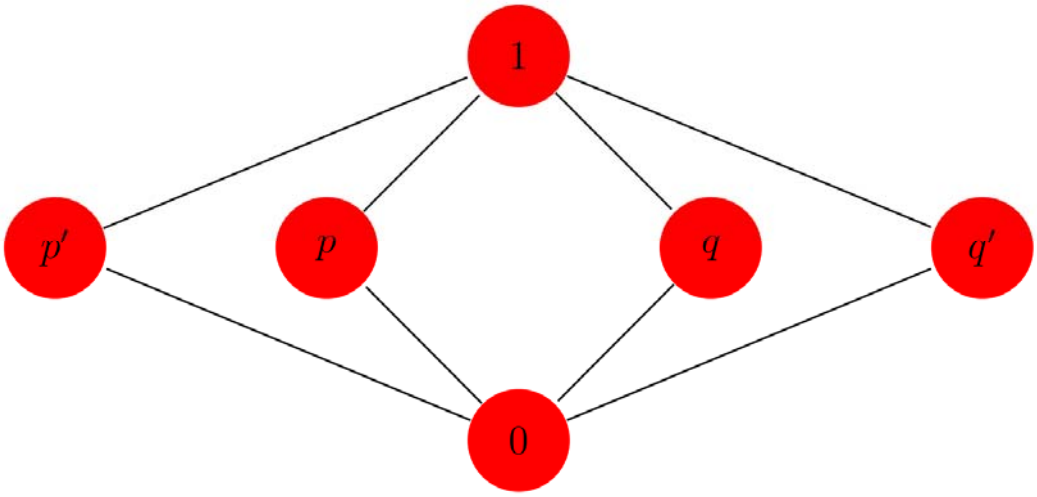

The "Chinese Lantern" lattice.

Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration

- We are seeking collaboration with theory driven researchers.

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