Quantum Internet Blueprint Workshop

Building a Quantum Internet

- Phased Approach
- Performance Characteristics
- Key Experiments, Milestones and Decision Points
- Timeline and Resource Requirements
- Impact on Classical Networking

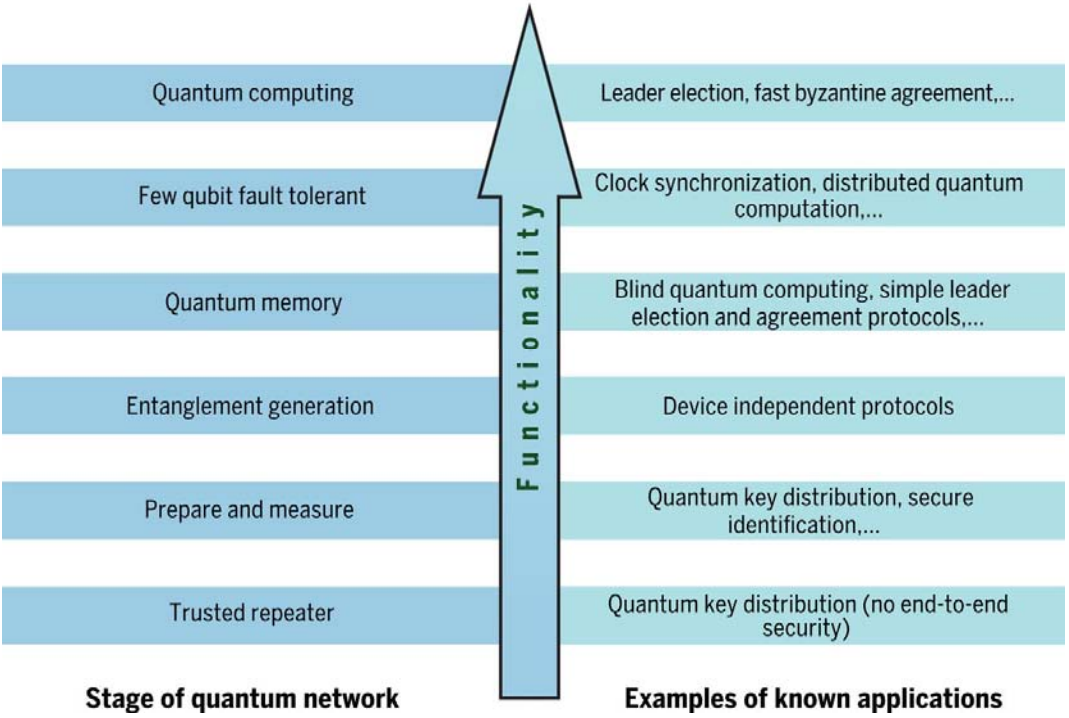
2040

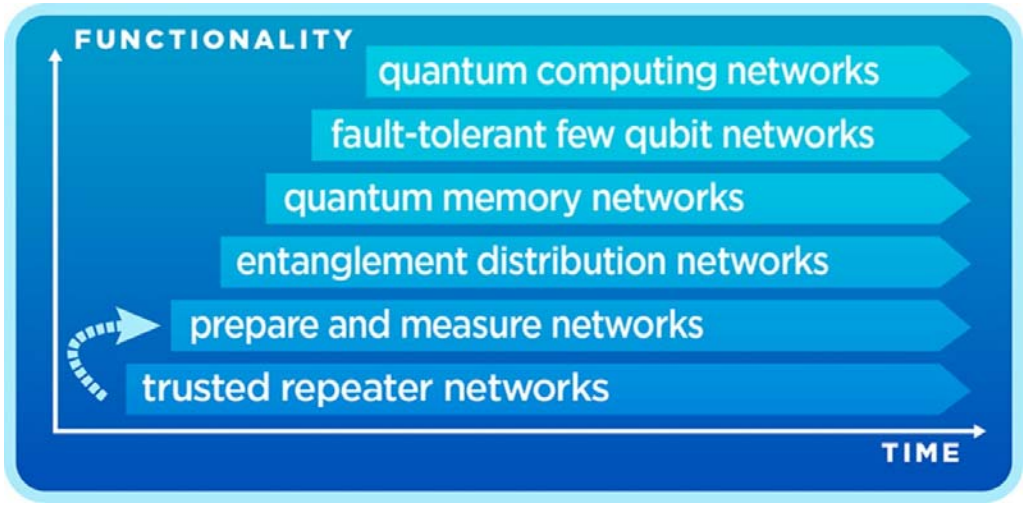
We live in a world where we have quantum internet

- Quantum secure communication
  - Intrinsic security unachievable with classical communication
- Network of quantum computers
  - Distributed quantum computing
  - Computation beyond classical computers
- Network of quantum sensors
  - Understanding of the universe
  - Understanding and prediction of natural phenomena

Quantum internet: A vision for the road ahead

Stephanie Wehner, David Elkouss, Ronald Hanson





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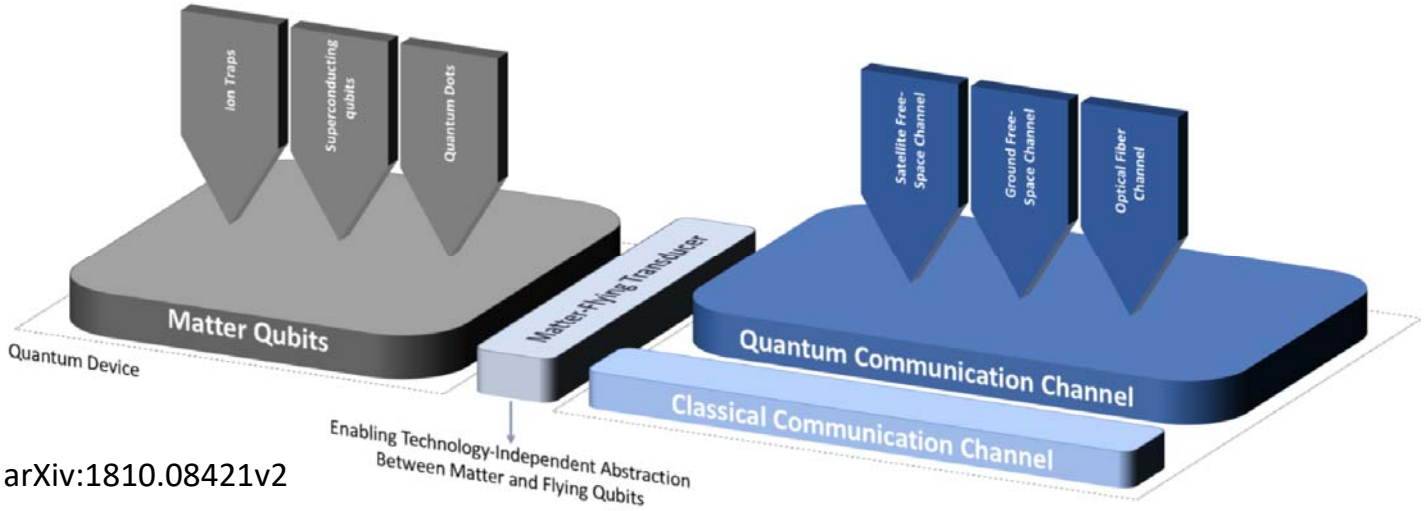
- Which scientific and engineering challenges we can address?
  - Short and long range links
  - Synchronization, transduction, multiplexing, controls
  - Entanglement distribution and repeaters
  - Simulations and protocols

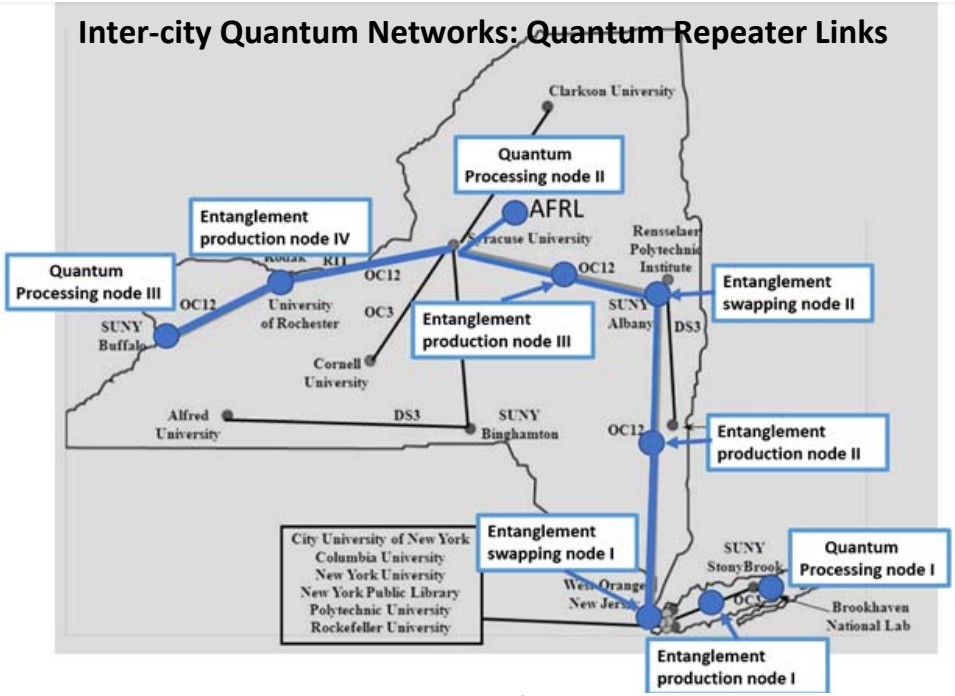


arXiv:1810.08421v2

2030

- Entanglement Distribution Quantum Repeater Networks
- Quantum Internet Stack
- Quantum Hardware Layer
- Quantum Link Layer
- Node Type I: Quantum Entanglement Banks
- Node Type II: Entanglement Swapping Nodes
- Inter-city Quantum Networks: Quantum Repeater Links
- Quantum switches and routing for more complex topologies

Inter-city Quantum Networks: Quantum Repeater Links



Quantum switches and routing for more complex topologies