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Entanglement Distribution

S&T Campaign: Computational Sciences
Advanced Computing Architectures

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Research Objective

- Understand the minimum node resources required for hi-fidelity entanglement distribution in lossy networks.

Challenges

- Elucidating the essential properties of entanglement distillation procedures.
- Elucidating minimal requirements for distillation procedures.
- Implementing procedures in a network setting with minimal node size.

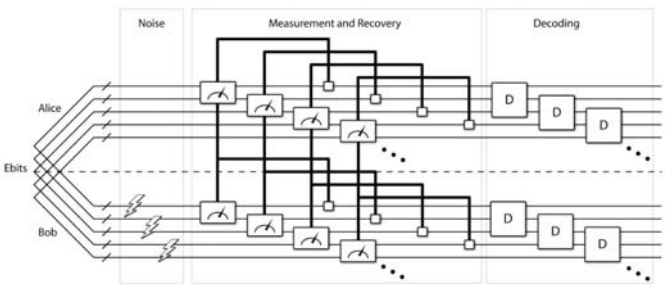


Diagram of an entanglement distillation procedure based on a convolutional quantum code.
-- Wilde, Krovi, Brun (2007).

ARL Facilities and Capabilities Available to Support Collaborative Research

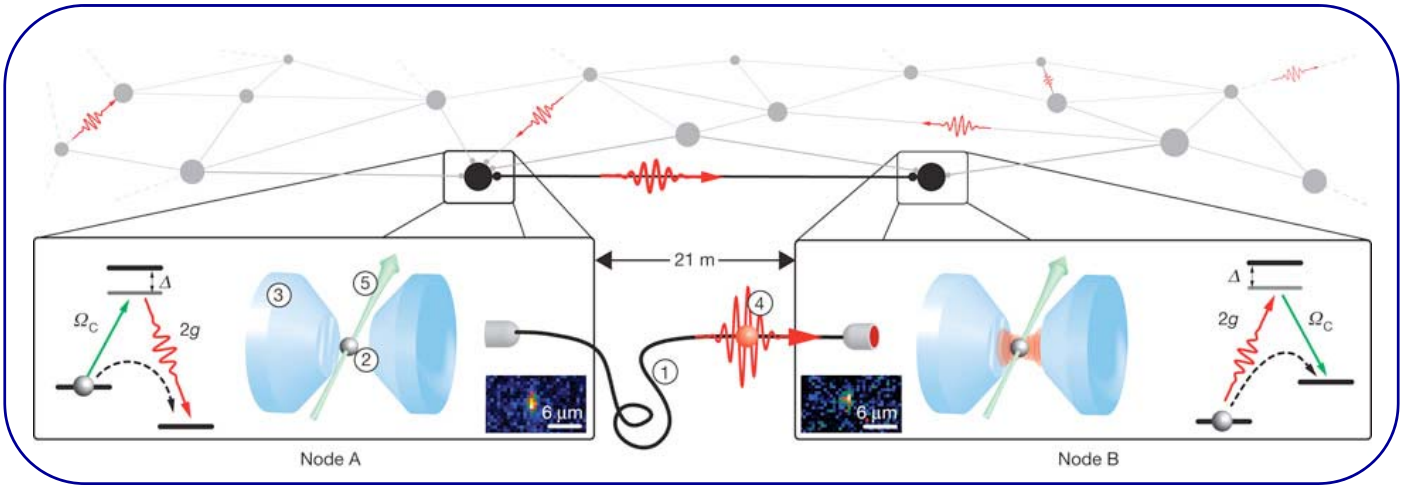
- Theory team with expertise in quantum Information and quantum control
- Supercomputers and HPC support staff

Expertise/Facilities/Capabilities Sought in Collaboration

- Complementary expertise in quantum information theory.

References

- Bennett *et al.*, Phys. Rev. Lett. 76, 722 (1996).
- Hiroshima, Phys. Rev. Lett. 91, 057902 (2003).
- Eisert, Browne, Scheel, Plenio, Annals of Physics 311, 431 (2004)



Schematic diagram of a quantum network with a single atom at each node (Rempe group, Nature (2012)).

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