MONTANA STATE UNIVERSITY

Spectrum LAB
Montana State University

QUANTUM NETWORKING CAPABILITIES

Quantum networking testbed for system characterization

Entangled photon sources, hybrid quantum-classical networks and entanglement verification in the telecom C-band.



Quantum and classical hybrid networking

We build the hardware for secure quantum communication: sources of entangled photons, instruments that verify them, and networks that carry real-world traffic across campus

98%
Entanglement fidelity from our photon source

25 km
Length of telecom fiber carrying entangled photons

1.16 Tbps
Classical data carried alongside quantum keys

12
Pairs of telecom channels to serve multiple users

OUR QUANTUM TECHNOLOGIES



Entangled Photon Source

Sagnac source of polarization-entangled photon pairs

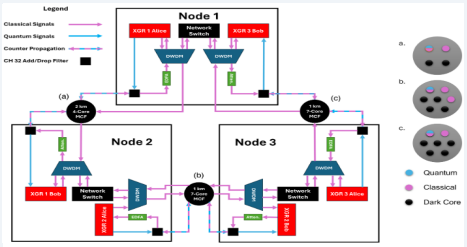
- 98% fidelity · 97% purity
- CHSH S = 2.8,
- 20.4 nm bandwidth across 12 ITU channel pairs
- Tested over 25 km fiber, 2 km multicore fiber and free space



Polarization Analysis Module

All-fiber module that checks entanglement after transport

- CHSH & quantum state tomography
- < 2 ms response · 1530–1565 nm
- Built-in calibration with any C-band reference
- 2U rack-mount · works with any C-band entangled photon source



Multicore Fiber Networking

Quantum keys and classical data in the same fiber core

- Three-node network – serving the Innovation Campus
- 1.16 Tbps data + 7.4 kbps secret keys
- Built using off-the-shelf telecom equipment
- Plug & play operation

Work with us

- Integrating quantum into existing networks
- Testing entanglement transport over fiber and free space
- Rack-mount prototypes ready for field trials
- Training students for the quantum workforce

EXPLORE OUR RESEARCH

spectrum.montana.edu

Mountains and Minds
Montana State University

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