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(57) Abstract :

A hybrid quantum-classical routing protocol (103) is disclosed for enabling seamless, secure, and efficient communication across quantum routers (101) and classical routers (102). The system includes a hybrid routing layer (104) and a centralized hybrid control unit (105) that collaboratively manage real-time path selection, entanglement-based key distribution, and classical traffic routing. It supports adaptive failover, dynamic route scoring, and dual-domain packet interpretation using a dual-header structure. This protocol facilitates robust and scalable future internet infrastructure by integrating quantum security with classical network efficiency under heterogeneous traffic conditions.

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