

# Quantum Internet: from classical to quantum paths

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## Abstract

Generally, in a quantum network, the information carriers are treated quantum mechanically, but the paths through which they propagate are still classical, obeying the laws of classical causality. But this assumption can be generalized such as, not only the information or the channels, but also the placement of the channels – i.e., the paths along with the carriers propagate – can be quantum. This unconventional placement of channels has been theoretically and experimentally verified, and it has been proven to be able to describe powerful setups for the transmission of both classical and quantum information. This genuine quantum phenomenon plays a paramount role for achieving unprecedented information transfer capacities, and it must be fully understood and harnessed for the Quantum Internet design.

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