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Asymptotically Limitless Quantum Energy Teleportation via Qudit Probes[1] GUILLAUME VERDON-AKZAM, Institute for Quantum Computing - University of Waterloo, EDUARDO MARTN-MARTNEZ, Institute for Quantum Computing - Perimeter Institute - University of Waterloo, ACHIM KEMPF, Perimeter Institute - Institute for Quantum Computing - University of Waterloo — We propose a modified Quantum Energy Teleportation (QET) scheme that uses arbitrary-dimensional qudit probes and polynomially localized Hamiltonians. We find that with an appropriate scaling of parameters, the teleported energy scales with the teleportation distance more favourably than the nonlocal tails of the Hamiltonians. We show that by allowing the exchange of arbitrary amounts of information between agents and in a suitable limit, an arbitrarily large amount of energy can be teleported through a massless quantum field.

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