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Fidelity of recovery and geometric squashed entanglement KAUSHIK SESHADREESAN, MARK WILDE, Louisiana State University — We define the fidelity of recovery of a tripartite quantum state on systems A, B, and C as a measure of how well one can recover the full state on all three systems if system A is lost and a recovery operation is performed on system C alone. The surprisal of the fidelity of recovery (its negative logarithm) is an information quantity which obeys nearly all of the properties of the conditional quantum mutual information $I(A;B|C)$, including non-negativity, monotonicity under local operations, duality, and a dimension bound. We then define an entanglement measure based on this quantity, which we call the geometric squashed entanglement. We prove that the geometric squashed entanglement is an entanglement monotone, that it vanishes if and only if the state on which it is evaluated is unentangled, and that it reduces to the geometric measure of entanglement if the state is pure. We also show that it is sub-additive, continuous, and normalized on maximally entangled states. Our results for the bipartite case can easily be extended to a multipartite fidelity of recovery and a multipartite geometric squashed entanglement.

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