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All teleportation and dense coding schemes.  (English summary)
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Quantum teleportation and dense coding are two central processes in the growing field of quantum information. Both demonstrate the new features of quantum information and require quantum entangled states. The two processes are not independent: so far, any teleportation scheme also works as a dense coding scheme and vice versa. In this paper all “tight” teleportation and dense coding schemes (i.e., those in which all the Hilbert spaces involved have the same finite dimension $d$, and the classical channel involved distinguishes $d^2$ signals) are classified. A one-to-one correspondence is then established between (1) quantum teleportation schemes, (2) dense coding schemes, (3) orthonormal bases of maximally entangled states, (4) orthonormal bases of unitary operators with respect to the Hilbert-Schmidt scalar product, and (5) depolarizing operations, whose Kraus operators can be chosen to be unitary.

Reviewed by Adán Cabello

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