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Quantum image encryption based on generalized Arnold transform and double random-phase encoding.
Summary: A quantum realization of the generalized Arnold transform is designed. A novel quantum image encryption algorithm based on generalized Arnold transform and double random-phase encoding is proposed. The pixels are scrambled by the generalized Arnold transform, and the gray-level information of images is encoded by the double random-phase operations. The keys of the encryption algorithm include the independent parameters of coefficients matrix, iterative times and classical binary sequences, and thus, the key space is extremely large. Numerical simulations and theoretical analyses demonstrate that the proposed algorithm with good feasibility and effectiveness has lower computational complexity than its classical counterpart.

Keywords: generalized Arnold transform; double random-phase encoding; quantum image encryption
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