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Universal Superadiabatic Geometric Quantum Gates in Nitrogen-Vacancy Centers HUI YAN, ZHENGTAO LIANG, South China Normal University, SHILIANG ZHU, Nan Jing University — We propose a scheme to implement a universal set of quantum gates based on geometric phases and superadiabatic quantum control. The proposed quantum gates consolidate the advantages of both strategies for robust and fast. The diamond nitrogen-vacancy center system is adopted as a typical example to illustrate the scheme. We show those gates can be realized in a simple two-level configuration by appropriately controlling the amplitude, phase and frequency of just one microwave field. The robust and fast features are confirmed by comparing the fidelities of the proposed superadiabatic geometric phase gate with three other kinds of phase gates.

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