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Defects as qubits in SiC LUKE GORDON, ANDERSON JANOTTI, C.G. VAN DE WALLE, University of California, Santa Barbara — The NV- center in diamond has been extensively studied as a promising qubit for quantum computing applications. However, technological limitations of the NV center in diamond impel a search for alternative defects in other materials which possess NV-like characteristics. Using first-principles calculations based on hybrid density functional theory, we explore possible defects in 4H- and 3C-SiC that hold potential as new solid-state qubits. Specifically, the divacancy in 4H and 3C -SiC and N-V centers in 3C-SiC are investigated. The calculated excitation and emission energies of the divacancy in 4H-SiC can explain the experimental data. In addition, our results indicate that the neutral divacancy and the negatively-charged N-V center in 3C-SiC are promising candidates as qubits; both defects are stable in n-type 3C-SiC, opening a pathway for possible coupling with charge carriers.

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