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Pairing in graphene: A Monte Carlo study TIANXING MA, Department of Physics, Beijing Normal University, ZHONGBING HUANG, FEIMING HU, HAI-QING LIN — To address the issue of possibility of inducing superconductivity in graphene, we study the behavior of pairing correlation in the extended repulsive Hubbard model on a honeycomb lattice within both determinant quantum Monte Carlo and constrained path Monte Carlo method. We find that the system shows an antiferromagnetic correlation below Van Hove fillings. In the filling range of $<n>$=1.00 $\sim$ 1.20, pairing with $d + id$ symmetry is dominant over pairing with extent s symmetry, especially at low temperatures. The $d + id$-wave pairing susceptibility is enhanced as the electron filling increases, while the effective pairing interaction is suppressed. The summation of pairing correlation for long-range part is enhanced as the repulsion increases, however, for various lattice sizes and interactions, we find that the long-range part of $d + id$-wave pairing correlations both vanishes. Our results suggest that there maybe no superconductivity in pure and low doped graphene.

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