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Determinantal quantum Monte Carlo study of pairing instabilities on the honeycomb lattice TAO YING, STEFAN WESSEL, RWTH Aachen University — Using finite-temperature determinantal quantum Monte Carlo calculations, we re-examine the pairing susceptibilities in the Hubbard model on the honeycomb lattice, for doping onto and away from the van Hove singularity (VHS). Explicitly, two electronic fillings, 3/8 and 0.2 are considered. Due to a serious sign problem at strong coupling strengths, we focus on the weak interaction region of the Hubbard model Hamiltonian. From analyzing the temperature dependence of various pairing susceptibilities, we find different dominant pairing channels at and away from the VHS: in the later case, singlet d+id-wave is the dominant pairing state, while at the VHS, triplet next-nearest-neighbor f-wave pairing emerges as a leading instability. Possible instabilities to spin density wave states (SDW) are also investigated.

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