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Triplet p-wave pairing correlation in low doped zigzag graphene nanoribbons TIANXING MA, Beijing Normal University, FAN YANG, Beijing Institute of Technology, ZHONG-BING HUANG, Hubei University, HAI-QING LIN, Beijing Computational Science Research Center — We reveal an edge spin triplet $p-$wave superconducting pairing correlation in slightly doped zigzag graphene nanoribbons. By employing combined random phase approximation, the finite temperature determinant quantum Monte Carlo approach, and the ground state constrained path quantum Monte Carlo method, it is shown such a spin triplet pairing is mediated by the ferromagnetic fluctuations caused by the flat band at the edge. The edge spin susceptibility and effective pairing interactions strongly increase as the on-site Coulomb interaction increases, indicating the importance of electron-electron correlation. It is also found that the doping dependent ground state p-wave pairing correlation bears some similarity to the famous superconducting dome in the phase diagram of high-temperature superconductor, while the spin correlation at the edge is weakened as the system is doped away from half filling.

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