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Gapped triplet p-wave superconductivity in strong spin-orbit-coupled semiconductor quantum wells in proximity to s-wave superconductor MING-WEI WU, TAO YU, Univ of Sci Tech of China — We show that the gapped triplet superconductivity can be realized in strong spin-orbit-coupled (100) quantum wells in proximity to s-wave superconductor. It is revealed that with the singlet order parameter induced from the superconducting proximity effect, in quantum wells, not only can the triplet pairings arise due to the spin-orbit coupling, but also the triplet order parameter can be induced due to the repulsive effective electron-electron interaction. Specifically, we derive the effective Bogoliubov-de Gennes equation, in which the self-energies due to the effective electron-electron interactions contribute to the singlet and triplet order parameters. It is further shown that for the singlet order parameter, it is efficiently suppressed due to this self-energy renormalization; whereas for the triplet order parameter, it is the p-wave $(p_x \pm ip_y)$ one with the **d**-vector parallel to the effective magnetic field due to the spin-orbit coupling. Finally, we perform the numerical calculation in InSb (100) quantum wells. It shows that with proper electron density, the minimum of the renormalized singlet and the maximum of the induced triplet order parameters are comparable, and hence can be experimentally distinguished.

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