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Strong and weak 2D topological superconductors with spin-orbit coupling HONG YAO, Institute for Advanced Study, Tsinghua University, Beijing, FAN YANG, School of Physics, Beijing Institute of Technology, Beijing — We study pairing symmetries of superconducting states in a centrosymmetric system with quasi-one dimensional bands and spin-orbit coupling. When the spin-orbit coupling is weak, we mainly find even-parity pairing which is topologically trivial. When the spin-orbit coupling is (moderately) strong, the paring is dominantly p-wave, which is an odd-parity pairing. Depending on the interaction parameters, we find two different odd-parity pairing states. One has p+ip pairing with nonzero strong topological invariants, which breaks time reversal symmetry and possesses gapless chiral Majorana modes. The other has p+ip pairing for spin-up electrons but p-ip pairing for spin-down electrons, which preserves time reversal symmetry and hosts nontrivial weak Z_2 topological invariants. In the weak topological superconductors, there are gapless modes associated with lattice dislocations. Possible applications to the recent discovered BiS-based superconductors will be discussed.

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