Superconducting states of topological surface states in $\beta$-PdBi$_2$ investigated by STM/STS KATSUYA IWAYA, RIKEN-CEMS, KEN-JIRO OKAWA, Tokyo Institute of Technology, TETSUO HANAGURI, YUHGI KOHSAKA, TADASHI MACHIDA, RIKEN-CEMS, TAKAO SASAGAWA, Tokyo Institute of Technology — We investigate superconducting (SC) states of topological surface states in $\beta$-PdBi$_2$ using very low temperature STM. Characteristic quasiparticle interference patterns strongly support the existence of the spin-polarized surface states at the Fermi level in the normal state. A fully-opened SC gap well described by the conventional BCS model is observed, indicating the SC gap opening at the spin-polarized Fermi surfaces. Considering a possible mixing of odd- and even-parity orbital functions in $C_{4v}$ group symmetry lowered from $D_{4h}$ near the surface, we suggest that the SC gap consists of the mixture of $s$- and $p$-wave SC gap functions in the two-dimensional state.