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Dirac Fermion induced Parity Mixing in Superconducting Topological Insulators TAKESHI MIZUSHIMA, Okayama University, AI YAMAKAGE, MASATOSHI SATO, YUKIO TANAKA, Nagoya University — We self-consistently study surface states of the recently discovered superconducting topological insulator $Cu_xBi_2Se_3$. We demonstrate that if a topologically trivial bulk s-wave paring symmetry is realized, parity mixing of pair potential near the surface is anomalously enhanced by surface Dirac fermions, opening an additional surface gap larger than the bulk one. Contrary to classical s-wave superconductors, the resulting surface density of state hosts an extra coherent peak at the induced gap besides a conventional peak at the bulk gap. In contrast, no such a surface parity mixing is induced by Dirac fermions for topological odd-parity superconductors. Our calculation suggests that a simple U-shaped spectrum of scanning tunneling microscope is not originated from s-wave superconductivity of $Cu_xBi_2Se_3$.

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