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Majorana Fermions at the End of Topological Insulator Nanoribbon XIONGJUN LIU, YUQIN CHEN, Peking Univ — Majorana zero modes can exist at the end of a 1D p-wave SC. 1D semiconductor nanowire approximated a s-wave superconductor is a famous one of those proposals. In which, strong Zeeman field is required to have a large topological region, but unfortunately suppresses superconducting pairing and makes the system more sensitive to disorder. Here we propose a Nanoribbon system made of 2D topological insulator where finite size effect due to the narrow width between two edges plays an important role. A ferromagnetic insulator and an s-wave superconductor are attached at each edge, respectively. We introduce a low energy effective model to investigate the superconducting phase diagram. And, the disorder effect is studiedanalytically by using the self-consistent Born approximation(SCBA). Furthermore, realistic numerically calculation is carried out with a tight-binding model. We demonstrate that, strong Zeeman field generates a large topological region, and at the same time enhances superconducting pairing and makes the system more immune to disorder.

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