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**New Topological Superconducting phase in Superconductor/2D Topological Insulator/Superconductor Junction** YAO LU, KAM TUEN LAW, The Hong Kong University of Science and Technology — It is well known that a Josephson junction built on top of helical edge states of the topological insulator traps two Majorana fermions when the phase difference between the two superconductors is  $\pi$  and the system can be considered as a DIII class topological superconductor. In this work, we show that a narrow strip of two dimensional topological insulator coupled to two superconductors, forming a Josephson junction, can support a new topological phase in the presence of an in plane magnetic field. In this phase, each end of the strip of the topological insulator supports a single Majorana fermion for a wide range of phase difference between the two superconductors. This topological phase can be revealed by Josephson current measurements and tunneling spectroscopy experiments.

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