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**An attempt to engineer topological superconductivity  
on  $(\text{Bi}_{x-1}\text{Sb}_x)_2\text{Te}_3/\text{Nb}$  surface state**

Keywords: Topological superconductivity, Proximity effect, Superconductor

**Abstract:**

*There are two proposed ways to obtain topological superconductivity in materials. One way is searching for materials that can intrinsically host these exotic states. Due to challenges with the proposed candidates, however, it was suggested that these states can be created with the coupling of topological surface states with s-wave superconductors. In the ultra-thin limit, however, the bulk of these topological insulators becomes metallic. In this experiment, a heterostructure consisting of a topological insulator with no metallic bulk state,  $(\text{Bi}_{x-1}\text{Sb}_x)_2\text{Te}_3$ , and a superconductor, Nb, was studied and found the coupling between the two massively reduces in absence of metallic bulk state.*