

Majorana fermions in hybrid superconductor-semiconductor nanowire devices

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Our recent experiment carried out in hybrid superconductor-semiconductor nanowire devices gave the first experimental evidence for the existence of Majorana fermions [1]. However, open questions need to be answered. Majorana fermions have to come in pairs, but before we were only capable of probing one Majorana fermion. Besides, Majorana fermions should be fully gate controllable, which could not be demonstrated very convincingly. Currently we are performing new experiments in similar but improved devices. We study three terminal normal-superconductor-normal InSb nanowire devices. This enables the possibility to simultaneously probe both Majorana fermions occurring at the ends of the superconducting contact by using tunneling spectroscopy from normal to superconducting contact. Furthermore, the devices have an improved gate design enabling more efficient gating under the superconducting contact. We report our results on the ongoing experiments.

[1] V. Mourik, K. Zuo et al., *Science* **336**, 1003 (2012).