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Majorana fermions in hybrid superconductor-semiconductor nanowire devices VINCENT MOURIK, KUN ZUO, DAVID VAN WOERKOM, Delft University of Technology, SERGEY FROLOV, University of Pittsburgh, SEBASTIEN PLISSARD, ERIK BAKKERS, Eindhoven University of Technology, LEO KOUWENHOVEN, Delft University of Technology — Our recent experiment carried out in hybrid superconductor-semiconductor nanowire devices gave the first experimental evidence for the existence of Majorana fermions [1]. However, some 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. Furthermore the observed conductance peak was only at 5% of the theoretically expected height of $2e^2/h$. 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. The first measurements already give a larger peak amplitude and the peak is visible in a larger magnetic field range. [1] V. Mourik, K. Zuo et al., Science, Vol. 336 no. 6084 pp. 1003-1007

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