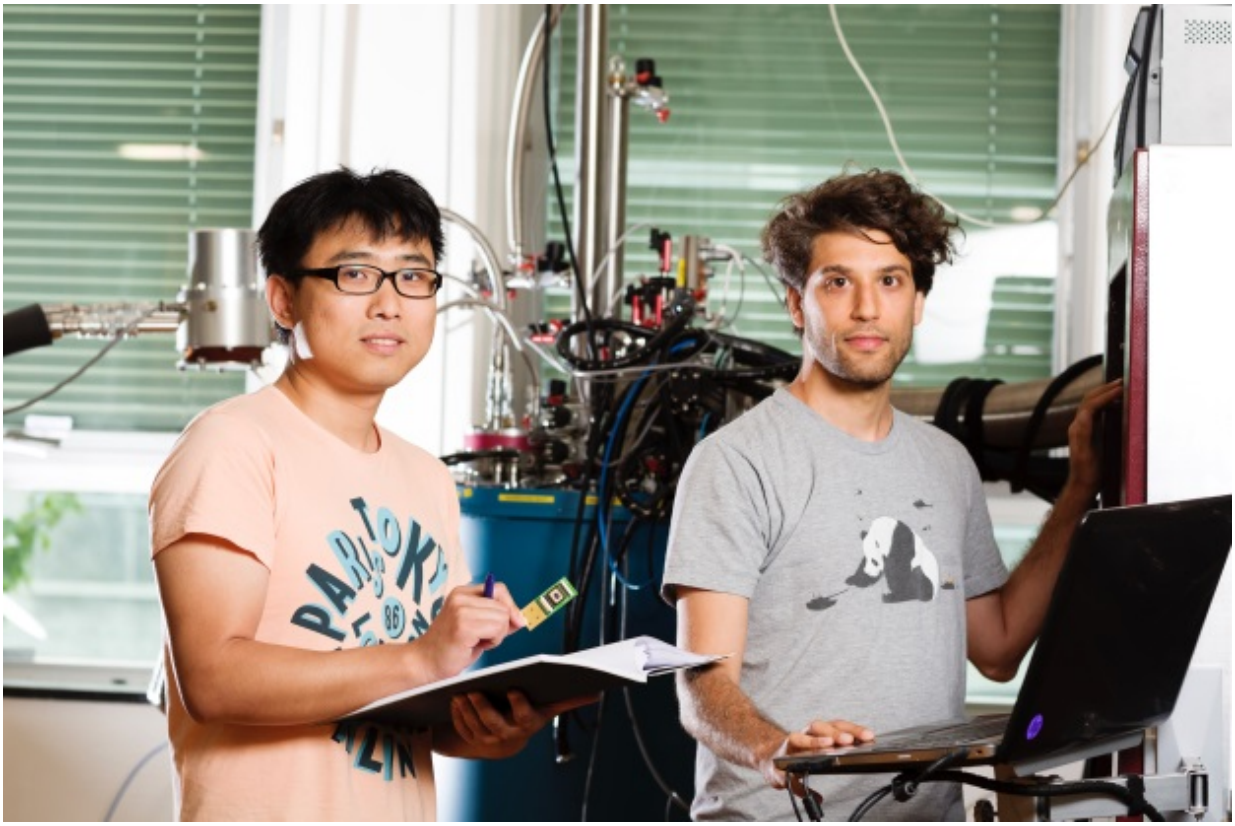
Majorana highway on a chip

July 7 2017



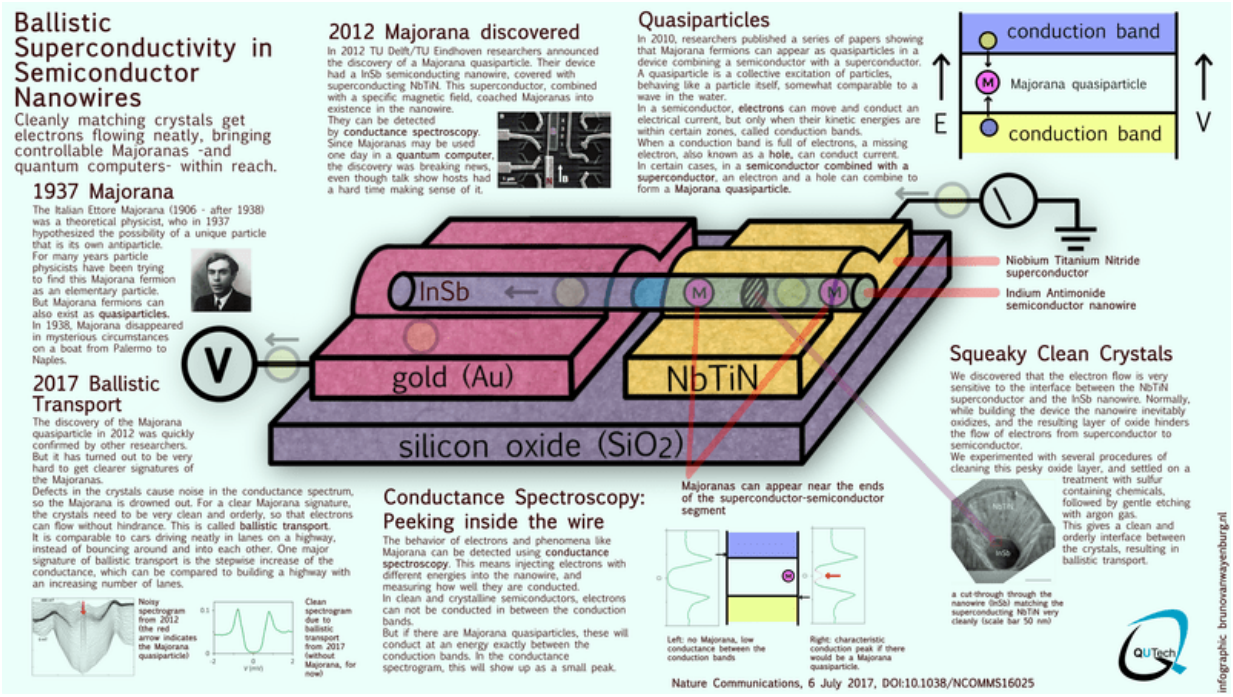
Hao Zhang (left) and Önder Gül with the Majorana chip and experimental setup. Credit: Netherlands Organisation for Scientific Research (NWO)

The first experimental evidence of a Majorana fermion in Delft 2012 led to a wave of scientific enthusiasm: control such particles are a holy grail in quantum science and technology. Quantum chips based on Majorana fermions promise error-protected quantum computations. However, the

fabrication of Majorana devices is an extremely challenging task.

A collaboration of researchers has now combined novel nanowires with a high-quality interface to other required materials on a chip. This allows for bullet-like collisionless quantum transport of charges through the nanowires: a requirement for larger-scale Majorana-based experiment.

The novel methods open doors towards quantum computations based on Majorana fermions, allow for the exploration of new quantum effects in such materials ánd can have future applications in energy-efficient electronics.



The infographic made by Bruno van Wayenburg for all interesting details of this novel quantum chip and its future applications. Credit: Netherlands Organisation for Scientific Research (NWO)

More information: Hao Zhang et al. Ballistic superconductivity in semiconductor nanowires, *Nature Communications* (2017). DOI: 10.1038/ncomms16025