

Adjustable nanofabricated atomic size contacts

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Metallic point contacts and tunnel junctions with a small and adjustable number of conduction channels have been obtained in the last few years using scanning tunneling microscope and break junction techniques. For conventional break junctions, the reported drift of the interelectrode spacing in the tunnel regime is typically of the order of 0.5 pm/min (1 pm=10⁻¹² m). We have nanofabricated break junctions which display a drift smaller than 0.2 pm/h. The improvement results from the scaling down by two orders of magnitude of the device dimensions. We describe the nanofabrication process, which can be adapted to most metals. We have performed measurements on Al, Cu, and Nb devices. The results illustrate the ability of the technique to explore phenomenalike conductance quantization and two level fluctuations. These new adjustable atomic size contacts and tunnel junctions can be integrated in complex circuits. © 1996 American Institute of Physics.