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CHARGE TRANSPORT THROUGH LOCALIZED BARRIER STATES IN SUPERCONDUCTING HETEROSTRUCTURES

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Abstract

Thin film heterostructures composed of superconducting electrodes (molybdenum rhenium alloy) and a nanoscale silicon layer doped with tungsten, have been designed and experimentally studied. The current-voltage characteristics of junctions exhibiting local maxima of the current against the background of abrupt current increases for the first time, were measured in the voltage range of -800 to 800 mV, at temperatures of 4.2–8 K. The positions of these singularities, which are symmetrical with respect to zero voltage, varied from sample to sample within the range of 40–300 mV. With increasing temperature, they became blurred and completely vanished with the disappearance of superconductivity in the electrodes. The nature of the observed singularities is associated with the properties of electron tunneling through the impurity states localized in the semiconducting barrier.

Type of Book of Abstracts

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