MAR07-2006-003565

Abstract for an Invited Paper
for the MAR07 Meeting of
the American Physical Society

Gate-controlled superconductivity in diffusive multiwalled carbon nanotube[1]

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We have investigated electrical transport in a diffusive, PECVD-grown multiwalled carbon nanotube contacted using superconducting leads made of Al/Ti sandwich structure. We find proximity-induced superconductivity with measured critical currents up to $I_{cm} = 1.3$ nA, tunable by gate voltage. The supercurrent branch displays a finite zero bias resistance which varies as $R_0 \propto I_{cm}^{-\alpha}$ with $\alpha = 0.74$. We discuss the interpretation of these findings in terms of the RCSJ-model as well as the diffusive junction model for long SNS structures. In addition, we will compare the results with our recent data on proximity-induced supercurrents in singlewalled carbon nanotubes.

[1]This work was financially supported by Academy of Finland and by European Union (CARDEQ, FP6-IST-021285-2).