Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Double-gap proximity effect in nanotubes SMITHA VISHVESHWARA, University of Illinois at Urbana-Champaign, KARYN LE HUR, Yale University — We study the properties of a single-walled metallic carbon nanotube placed on a superconducting substrate. Given that the nanotube possesses two bands in its excitation spectrum, we find a novel proximity effect which allows the existence of a "double superconducting gap." We show that there is a critical experimentally-accessible interaction strength in the nanotube at which this proximity effect transitions from being suppressed to being enhanced. We also analyze the effect of possible phase fluctuations within the substrate on the induced superconductivity. We discuss the consequences of these features on the single-particle tunneling density-of-states of the nanotube.

Karyn Le Hur
Unversitte de Sherbrooke

Date submitted: 17 Nov 2006 Electronic form version 1.4