

Abstract Submitted  
for the DAMOP05 Meeting of  
The American Physical Society

**Is a multi walled nanotube one-dimensional?** MIKHAIL ZAMKOV, NATHAN WOODY, BING SHAN, ZENGHU CHANG, PATRICK RICHARD, James R. Macdonald Laboratory, Department of Physics, Kansas State University, Manhattan, KS 66506-2604 — Despite the structural similarity between the single and multi walled nanotubes (SWNTs and MWNTs), the nature of electron transport in these systems was found to be fundamentally different. In contrast to a SWNT, where conduction electrons are constrained to interact in a strictly one-dimensional manner (Luttinger-liquid system), electron excitations in a MWNT exhibit a distinct multi-dimensional Fermi-liquid behavior. The latter was demonstrated experimentally by comparing the femtosecond decay dynamics of electrons excited into different conduction bands of a MWNT, consisting, on average, of 15 coaxial SWNT shells. The observed temporal evolution provides strong evidence that long-range e-e interaction along the tube vanishes due to screening, indicating that multi-dimensional nature of charge propagation should be invoked in modeling electronic properties of MWNTs. This work was supported by Chemical Sciences, Geo-sciences and Biosciences Division, Office of Basic Energy Sciences, Office of Science, U. S. Department of Energy.

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Date submitted: 01 Feb 2005

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