Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

The thermoelectric properties of Bi nanowires. Role of quantum size and surface effects.[1] TITO HUBER, Howard University, 500 College St. N.W., Washington DC 20059, ALBINA NIKOLAEVA, DMITRI GITSU, LEONID KONOPKO, Institute of Applied Physics, Academy of Sciences, Moldova, MICHAEL GRAF, Department of Physics, Boston College, Chestnut Hill, MA 02467. — Because of the increased density of states arising from one-dimensional confinement, it is anticipated that bismuth quantum wires will exhibit superior thermoelectric properties. Recently, angle-resolved photoemission spectroscopy (ARPES) studies have shown that Bi supports surface states that have not been considered in current models of quantum confinement. Studies of the Fermi surface, employing the Shubnikov-de Haas (SdH) method, in arrays of 30- to 80-nm bismuth nanowires partially corroborates ARPES findings. Assuming diffusive conditions, the impact of the excess surface carriers on the thermopower is to effectively make it smaller than that of bulk Bi, in agreement with measurements reported in the literature. We will report the result of experiments designed to decrease the concentration of surface carriers..

[1]Supported by National Science Foundation and Army Research Office

Tito Huber
Howard University, 500 College St. N.W., Washington DC 20059

Date submitted: 22 Nov 2006 Electronic form version 1.4