Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Ballistic and resonant negative photocurrents in single carbon nanotubes[1] CHRISTOPH KARNETZKY, LUKAS SPONFELDNER, MAX ENGL, ALEXANDER W. HOLLEITNER, Walter Schottky Institute and Physics Department, Technical University of Munich, Am Coulombwall 4a, 85748 Garching, Germany. — We present ultrafast photocurrent experiments on semiconducting, single-walled carbon nanotubes under a resonant optical excitation of their subbands. We demonstrate that a ballistic transport of the photogenerated charge carriers can be achieved. Moreover, thermionic emission processes to the contacts dominate the photocurrent. In contrast, the charge current without laser excitation is well described by a Fowler-Nordheim tunneling. The time-averaged photocurrent changes polarity as soon as sufficient charge carriers are injected from the contacts, which can be explained by an effective population inversion in the optically pumped subbands.

[1]We acknowledge the ERC via the project NanoREAL.

Christoph Karnetzky
Tech Univ Muenchen

Date submitted: 09 Nov 2016 Electronic form version 1.4