Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Electron transport properties in InAs ballistic devices MASATOSHI KOYAMA, MASATAKA INOUE, MASASHI FURUKAWA, HIROSHI TAKAHASHI, TOSHIHIKO MAEMOTO, SHIGEHIKO SASA, New Materials Research Center, Osaka Institute of Technology — A ballistic rectifier is one of the applications using ballistic electron transport properties, and has been fabricated by using high quality compound semiconductor heterostructures. We have observed a rectification for the first time in InAs triangular anti-dot structures at 77K and room temperature [1]. InAs/AlGaSb heterostructures provide relatively long mean free path for ballistic electron transport because of its high carrier density ($1.0 * 10^{12}$ cm^{-2} at 77K) and high electron mobility (200,000 cm^2/Vs at 77K). In the present report, we will focus on nonlinear electron transport properties in InAs asymmetric anti-dot structures as well as ballistic rectification effects at higher temperatures. In addition, the observed magnetotransport properties in the InAs ballistic rectifiers will be also presented at the conference. [1] M. Koyama et al., presented at the 14^{th} Int. Conf. on Nonequilibrium Carrier Dynamics in Semiconductors, 2005.

Masatoshi Koyama
New Materials Research Center, Osaka Institute of Technology

Date submitted: 30 Nov 2005 Electronic form version 1.4