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Ballistic rectification in four-terminal InAs/AlGaSb nanostructures MASATOSHI KOYAMA, HIROSHI TAKAHASHI, TATSUYA INOUE, TOSHIHIKO MAEMOTO, SHIGEHIKO SASA, MASATAKA INOUE, Nanomaterials Microdevices Research Center, Osaka Institute of Technology, NANOMATERIALS MICRODEVICES RESEARCH CENTER, OSAKA INSTITUTE OF TECHNOLOGY TEAM — Rectification effects based on ballistic electron transport properties occur in four-terminal InAs/AlGaSb nanostructures. We have investigated rectification effects in a sample application employing these properties. InAs/AlGaSb ballistic rectifiers consisting of two voltage probes and two current injection waveguide structures with a triangular anti-dot or slanted current injection waveguides [1]. In the anti-dot type device, rectification effects relying on the ballistic transport were observed at 77 K and 4.2 K. The voltages, V_{LU} were generated between lower and upper contact of the devices, which have a negative polarity regardless of the sample current polarity. The current-voltage characteristics showed good agreement with calculations from the multi-terminal Landauer-Büttiker formula [2]. For the latter device, the introduction of additional waveguide structures to one of the voltage probes facilitated room temperature operation. We report not only on the nonlinear electron transport properties but also on the temperature dependence from 4.2K to room temperature. [1] M. Koyama *et al.*, presented at the 28^{th} ICPS, Vienna (2006). [2] A.M. Song, PRB 59, 9806 (1999).

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