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Bloch oscillations in lateral periodic nanostructure arrays W. PAN, S.K. LYO, J.L. RENO, J.A. SIMMONS, Sandia National Labs, D. LI, S.R.J. BRUECK, CHTM, University of New Mexico — In a periodic structure of electron potential, under an external electric field E, if an electron can reach the boundary of the Brillouin zone (BZ) without being scattered, it undergoes Bragg reflection, passing back into the BZ on the opposite side. This results in a high frequency oscillation of electrons, i.e., Bloch oscillation (BO). Recently, BO has gained a renewed interest, as a Blochoscillator can be utilized as a frequency-tunable THz source. Work on BO has mainly been carried out in quantum well superlattices. On the other hand, a surface superlattices patterned into a two dimensional electron system has long been proposed as an alternative structure to generate BO. Here, we report our experimental results on the negative differential conductance and Bloch oscillation induced edge magnetoplasma resonance in a series of lateral superlattices. Results from the so-called reversed Bloch oscillations measurements and bolometric measurements will also be presented and discussed. Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin company, for the US Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. The facilities of the NSF-sponsored NNIN node at UNM were used for the fabrication.

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