

Abstract Submitted
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Current Instability Induced by Negative Differential Conductivity in the Quantum Hall Regime¹ KUAN TING LIN, YULING TSAI, YIPING LIN, J. C. CHEN, Dep. of Physics, National Tsing Hua University, Hsinchu, Taiwan, T. UEDA, S. KOMIYAMA, Dep. of Basic Science, University of Tokyo, Meguro-ku, Tokyo, Japan — We report a new kind of nonlinear effect at $\nu = 2$ Hall plateau in a two-dimensional electron gas system formed on a GaAs/Al_{0.3}Ga_{0.7}As heterostructure. Within the temperature $16 \text{ K} \leq T \leq 28 \text{ K}$, the current shows discernible zig-zag feature as the applied dc electric field increases beyond a critical value. Such an unstable feature is not only reproducible but also exhibits hysteresis as changing the sweeping direction of the electric field. We identify this current instability as the occurrence of the negative differential conductivity induced by the electric field. Physical origin of the nonlinearities will be presented and discussed.

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