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Tunable Channel Interference in an Aharonov-Bohm Ring[1] YIP-ING LIN, PEI-JUNG WU, KUAN-TING 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 have investigated the Aharonov-Bohm effect in a quasi one-dimensional ring on a GaAs/$Al_{0.3}Ga_{0.7}As$ heterostructure, which is defined by two metallic arc gates coupled to each branch of the ring. Each gate can be separately biased to uniformly squeeze the channel width of electrons, thereby externally tuning the transverse modes in the interference paths. The oscillatory magnetoconductance of the device is systematically studied by varying the number of channels in each path. We have observed the evidence of phase shifts in the magnetoconductance oscillations due to the suppression of the mode numbers on the ring path. Though the periodicity is not well resolved, qualitatively our data support the random phase shifts between the successive modes.

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