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Magneto-transport Study on the nanometer-scaled quantum-ring interferometer made of $Al_xGa_{1-x}N/GaN$ heterostructures[1] WEN-YUAN PANG, IKAI LO, YU-CHI HSU, YEN-LIANG CHEN, MING-HONG GAU, YUNG-HSI CHANG, YING-CHIEH WANG, JIH-CHEN CHIANG, Department of physics, National Sun Yat-sen University, Kaohsiung, Taiwan, Republic of China, JEN-KAI TSAI, Department of electronic engineering, National Formosa University, Yunlin, Taiwan, ROC — The quantum-ring interferometer has been proposed for spintronic application. The $Al_xGa_{1-x}N/GaN$ samples were grown on GaN-template buffer layer by plasma-assisted molecular beam epitaxy. We obtained the mobility and carrier density of two-dimensional electron gas to be 19845 cm^2/Vs and 5.18x10^{12} cm^{-2} by conventional van der pauw Hall measurement at temperature of 4.2 K, respectively. The samples were used to fabricate quantum-ring field-effect-transistors with different widths of conducting channel by Focus Ion Beam. The magneto-resistance measurement at temperature of 0.35 K and magnetic field up to 12 T was performed on these samples. The electronic characterization of nanometer-scaled quantum-ring made of high-mobility $Al_xGa_{1-x}N/GaN$ heterostructures has been studied.

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