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**New insight into Tunneling Process between Quantum Dot and Electron Gas** MASAKAZU MURAGUCHI, TETSUO ENDOH, Tohoku University, YOKO SAKURAI, SHINTARO NOMURA, YUKIHIRO TAKADA, KENJI SHIRAISHI, University of Tsukuba, MITSUHISA IKEDA, KATSUNORI MAKIHARA, SEIICHI MIYAZAKI, Hiroshima University, YASUTERU SHIGETA, University of Hyogo — We have theoretically investigated the time-evolution of electron wave function in tunneling from a two-dimensional electron gas (2DEG) to a quantum dot (QD). We have revealed that the electronic state in the electron gas significantly influences the electron tunneling. We clearly showed that the electron tunneling is modified depending on the initial electronic state in the 2DEG. The electron tunneling from 2DEG to QD is strongly enhanced when the initial state of the electron in the 2DEG is localized below the QD. This result indicates that the temporal and spatial fluctuation of electron distribution, which depends on temperature, plays a crucial role in the tunneling process. We will show that the obtained temperature dependence of electron tunneling coincides with our recent experiments of capacitance-voltage characteristic in a QD floating gate MOS capacitor.

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