

Gate-Controlled Spin-Orbit Interaction in InAs Quantum Well Structures Epitaxially Transferred onto Si Substrates

Kyung-Ho Kim,¹ Doo-Seung Um,² Hochan Lee,² Seongdong Lim,² Joonyeon Chang,¹ Hyun Cheol Koo,¹ Hyunhyub Ko,² and Hyung-jun Kim¹

¹*Spin Convergence Research Center,
Korea Institute of Science and Technology (KIST), Seoul 136-791, South Korea*

²*School of Energy and Chemical Engineering,
Ulsan National Institute of Science and
Technology (UNIST), Ulsan 689-798, South Korea*

Gate-controlled spin-orbit interaction (SOI) in InAs quantum well (QW) structures has been investigated after the epitaxial transfer onto Si substrates.[1] Successful epitaxial transfer of the QW structure after separation from an original InP substrate ensures that the InAs QW maintains a strong bonding interface and good crystalline quality with a high electron mobility. Furthermore, Shubnikov-de Haas (SdH) oscillation analysis reveals that a Rashba SOI parameter can be manipulated using a gate electric field for the purpose of spin field-effect transistor operation.

References:

[1] Kyung-Ho Kim et al., ACS Nano 7, 9106 (2013)