Abstract Submitted
for the PSF09 Meeting of
The American Physical Society

Full spin control in 2DEGs with no magnetic fields B.J. MOEHLMANN, MICHAEL FLATTÉ, University of Iowa — A properly chosen closed spin transport path in the plane of a III-V semiconductor quantum well suffices for arbitrary spin manipulation of conduction electrons about any desired axis. This feature of spin transport relies on the non-commutativity of the precession matrices associated with non-colinear path segments. The electron spin rotation depends solely on the path geometry, not the speed of the spin along the path. Simple closed paths have been found which will perform arbitrary spin rotations along arbitrary axes with no net spatial displacement of the spins. The paths differ depending on the form of the internal effective magnetic fields induced by crystal asymmetry, growth asymmetry, and strain and electric fields. This work was supported by an ONR MURI.

B.J. Moehlmann
University of Iowa

Date submitted: 13 Oct 2009 Electronic form version 1.4