MAR05-2004-002011

Abstract for an Invited Paper
for the MAR05 Meeting of
the American Physical Society

**Spin-Galvanic Effect in Semiconductor Quantum Wells**

SERGEY GANICHEV, Faculty of Physics, University of Regensburg

The electron spin in a homogeneous spin-polarized two- dimensional electron gas can drive an electric current if some general symmetry requirements are met (for review see [1]). The microscopic origin of the spin- galvanic effect is the inherent asymmetry of spin-flip scattering of electrons in systems with removed $k$-space spin degeneracy of the band structure. The spin-galvanic effect is quite general. It has been observed in various quantum well structures at temperatures varying from 4.2 K to 300 K and at different types of optical excitation in a wide spectral range from visible to the far infrared. Spin-galvanic effect provides new experimental aspect to spin properties of low dimensional semiconductor structures. In particular, the angular dependent measurements of the spin-galvanic current allow the separation of contributions to the band splitting due to Dresselhaus and Rashba terms in the Hamiltonian. Most recently the reversed spin-galvanic effect, i.e. a spin polarization induced by an electric current flow [2], has also been observed [3] demonstrating that a spin polarization can be achieved in non-magnetic semiconductor structures.

1. S.D. Ganichev, in series "Advances in Solid State Physics", B. Kramer (Ed.) (Springer-Verlag Berlin-Heidelberg), Vol. 43, pp. 427-442 (2003).

2. A.G. Aronov and Yu.B. Lyanda-Geller, JETP Lett. 50, 431 (1989).

3. S.D. Ganichev et. al, cond-mat/0403641 March 2004.