B-periodic oscillations in microwave irradiated high-mobility 2D electron gas

K. STONE, C.L. YANG, Z.Q. YUAN, R.R. DU, Rice University, L.N. PFEIFFER, K.W. WEST, Bell Laboratories, Lucent Technologies — Recently a new type of B-periodic magneto-oscillations was observed [1] in the Hall bar samples of a 2D electron gas under the irradiation of microwaves (MW, frequency $\omega$). The period $\Delta B$ is determined by $\omega$, the electron density $n_s$, and the distance between potential probes $L$, $\Delta B \propto n_s/\omega L$. The phenomenon is explained by coherent excitation of edge magnetoplasmons in the region near the contacts. Using very high-mobility ($8-20 \times 10^6$ cm$^2$/Vs) GaAs/Al$_x$Ga$_{1-x}$As heterostructures, we were able to observe both the MW-induced resistance oscillations, which is $1/B$-periodic, and the B-periodic oscillations in the same sample, in the frequency range 27 to 130 GHz. Experimental data as well as a brief discussion will be presented. [1] Kukushkin et al, Phys. Rev. Lett. 92, 236803 (2004).