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**Switching of magnetic domain structure in permalloy microstructures using 2D electron gas.** ANDREY BELKIN, MSD, Argonne National Laboratory and Illinois Institute of Technology, JAN FEDOR, PIOTR PANKOWSKI, VALENTYN NOVOSAD, GORAN KARAPETROV, MSD, Argonne National Laboratory, VLADIMIR CAMBEL, DAGMAR GREGUSOVA, ROBERT KUDELA, Institute of Electrical Engineering, Slovakia — We demonstrate the ability to monitor and change the magnetization state of microscopic permalloy element deposited on the active area of a 2DEG Hall probe. While sweeping the external magnetic field recorded Hall voltage signal provides information on local magnetization of the ferromagnetic element. Simultaneously, the exact magnetization state of permalloy element is imaged with a magnetic force microscope. Applying short, but intense current pulses through the Hall probe we can change the magnetization state of the permalloy ellipse. Such hybrid semiconductor-ferromagnet structures could offer novel direction for non-volatile memory storage elements.

Goran Karapetrov  
MSD, Argonne National Laboratory

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