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Label-free detection of DNA hybridization using InAs μ-Hall sensors KHALED ALEDEALAT, S. HIRA, K. CHEN, G.F. STROUSE, P.B. CHASE, P. XIONG, S. VON MOLNAR, Florida State University, G. MIHAJLOVIC, Argonne National Lab, M. FIELD, G. SULLIVAN, Teledyne Scientific Company LLC — We present results on label-free detection of DNA hybridization using InAs μ-Hall sensors. The μ-Hall sensor consisted of six 1-μm Hall crosses defined on an InAs quantum well substrate. The sensor was then covered with sputter-deposited SiO_2 and Au pads were patterned on top of some of the Hall crosses. Thiolated ssDNA strands that are complementary to one end of the target ssDNA were assembled on the Au pads and the rest of the device platform was passivated with PEG-silane. Biotinylated and fluorescently-tagged complementary ssDNA to the other end of the target ssDNA were labeled with commercial streptavidin-coated 350 nm superparamagnetic beads. Labeled ssDNA were found to assemble selectively onto the Au pads after mixing with the target ssDNA, indicating successful hybridization of the three ssDNA sequences. The presence of the assembled beads was successfully detected via the Hall sensor and confirmed using laser scanning confocal microscopy.
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