Magnetoresistive Biosensors for Quantitative Proteomics
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Abstract

Giant magnetoresistive spin-valve (GMR SV) sensors coupled with magnetic nanotags (MNTs) possess great promise as ultra-sensitive biosensors for diagnostics. We report an integrated sensor interface for an array of 256 GMR SV biosensors designed in 0.18 µm CMOS. Arranged like an imager, each of the 16 column level readout channels contains an analog front-end and a compact ΣΔ modulator (0.054 mm²) with 84 dB of dynamic range and an input referred noise of 49 nT/√Hz. Performance is demonstrated through detection of an ovarian cancer biomarker, secretory leukocyte peptidase inhibitor (SLPI), spiked at concentrations as low as 10 fM.