

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**Detection Limits of Captured Protein on the BioCD** DAVID NOLTE, XUEFANG WANG, KEVIN O'BRIEN, MING ZHAO, Purdue University — The BioCD is an interferometric biosensor that detects protein captured by antibody arrays. The sensor readout is performed on a spinning disc using a common-path interferometric configuration that is stable and sensitive to sub-monolayer coverage of captured protein. Protein is detected using phase quadrature that converts phase to intensity modulation using local generation of signal and reference to lock the relative phase of the waves. The purpose for spinning is to move far from  $1/f$  noise to achieve high surface mass sensitivity. Several different classes of the BioCD have been developed, differentiated by the means of generating the phase-locked reference. These include the microdiffraction (MD) class, the phase contrast (PC) class, the adaptive optical (AO) class and the in-line (IL) class of BioCD. Of these different quadrature classes, the in-line BioCD has the highest sensitivity with a detection sensitivity of 0.25 pg/mm. The minimum detectable mass is set by simple scaling relations. The metrology limit is set by surface roughness combined with repositioning offset between pre- and post-incubation scans. Optimal sensitivity is achieved by critical sampling of protein spots in radial arrays.

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Date submitted: 05 Dec 2007

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