

Abstract Submitted
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Exploring Molecular Recognition with Spinning-Disk Laser Interferometry DAVID NOLTE, LEILEI PENG, Purdue University, MANOJ VARMA, QuadraSpec, Inc. — We have developed a new laser heterodyne detection method that is sensitive to 0.1 nm average surface coverage of macromolecules on a solid support(1). Spinning-disk interferometry (SDI) is capable of detecting antibody-based molecular recognition at analyte volume concentrations down to 0.1 ng/ml and surface coverage to less than 500 molecules per square micron. This interferometric technique allows direct detection in the small-N limit through virtual molecular dipole transitions, in contrast to other small-N optical spectroscopy approaches that rely on real optical transitions through absorption or fluorescence detection. Sensitivity to enhanced molecular polarizability is observed in FITC-BSA molecules immobilized on silica. Potential applications of SDI in medical diagnostics and nanostructured materials characterization are being pursued. In these applications we have patterned proteins using a modified soft-lithography approach with polyacrylimide gels that lead to highly uniform and dense patterned BSA protein monolayers with rms surface roughness of 0.3 nm verified using AFM measurements. (1) Varma, M. M., D. D. Nolte, et al. (2004). “Spinning-disk self-referencing interferometry of antigen-antibody recognition.” Optics Letters **29**(9): 950-952.

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