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**Fluorescence-Based DNA-Nanotube Platform with Single Molecule Resolution** PRAKRIT JENA, ANKUR JAIN, University of Illinois at Urbana-Champaign, DANIEL HELLER, Massachusetts Institute of Technology, MARKITA LANDRY, YANN CHEMLA, University of Illinois at Urbana-Champaign, MICHAEL STRANO, Massachusetts Institute of Technology, TAEKJIP HA, University of Illinois at Urbana-Champaign — We have developed an experimental platform to control and modify the DNA on a DNA-Single Walled Nanotube (SWNT) complex for the purpose of detecting labeled and unlabeled protein-DNA interactions via visible fluorescence. By exploiting the distance-dependent photophysical interaction between organic fluorophores and the surface of a SWNT as the sensing mechanism, fluorophore-conjugated DNA-SWNTs are immobilized and observed using single molecule-total internal reflection microscopy. By analyzing the number of molecules, photobleaching steps and the absolute size of the observed DNA-SWNTs, we have confirmed the presence of a duplex, partial duplex and single-strand DNA scaffold on the SWNT surface using both nucleic acids and proteins as probes. Our approach offers multiple experimental schemes to extend the current use of carbon nanotubes for applications involving the interaction with biologically relevant molecules.

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