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Observation of molecular rings formed from DNA deposited on Au(111) PENGSHUN LUO, Department of Physics, North Carolina State University, MICHAEL S. WOODY, Department of Physics and Astronomy, University of North Carolina, Chapel Hill, NORMAN L. BEMELMANS, Department of Chemistry, North Carolina State University, THOMAS P. PEARL, Department of Physics, North Carolina State University — Beside its biological functions, DNA has been used as a building block for biological sensors and a template for electronic nanostructures. These applications require a deep understanding of how DNA molecules organize on particular surfaces as well as the electronic properties of an individual DNA molecule. Using scanning tunneling microscopy (STM) and atomic force microscopy (AFM), we have successfully characterized DNA deposited on Au(111), of various strand lengths and sequences. Here we report the observation of ring-like structures formed on the Au(111) surface by adsorption of 45 bp long, double stranded DNA. To understand the nature of these structures, deposition parameters such as DNA concentration, exposure time, and buffer solution were varied. In an attempt to gain more insight into the structures, a computer model was constructed based on electrostatic interaction between the DNA molecules. This model provides additional information about the composition and formation mechanisms of the ring structures.

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