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DNA size and conformations analysis using a synthetic nanopore DANIEL FOLOGEA, University of Arkansas, Physics Department, Fayetteville, AR72701, JAMES UPLINGER, University of Arkansas, Physics Department, Favetteville, AR72701, BRIAN THOMAS, University of Arkansas, Physics Department, Fayetteville, AR72701, BRADLEY LEDDEN, University of Arkansas, Physics Department, Fayetteville, AR72701, ERIC BRANDIN, Harvard University, Department of Molecular and Cellular Biology, Cambridge, MA02138, DANIEL BRAN-TON, Harvard University, Department of Molecular and Cellular Biology, Cambridge, MA02138, JIALI LI, University of Arkansas, Physics Department, Fayetteville, AR72701 — Our work reveals the ability of a synthetic nanopore made in a silicon nitride membrane to discriminate between different conformations and lengths of DNA molecules and presents a comparative analysis with the electrophoretic behavior of the same DNA. Double stranded linear, supercoiled and relaxed form of the same DNA, linear restriction fragments, as well as single stranded DNA, are passed through a synthetic nanopore filled with a buffered ionic solution, and a subsequent analysis in terms of current blockage, translocation time and integrated events area shows the analytical ability of such a device. Also, we prove that an intercalating agent increases the temporal resolution by increasing the translocation time up to a factor of two.

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