Abstract Submitted
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Next Generation Epigenetic Detection Technique: Identifying Methylated DNA using Graphene Nanopore[1] TOWFIQ AHMED, Los Alamos National Laboratory, JASON T. HARALDSEN, Department of Physics and Astronomy, James Madison University, Harrisonburg, VA 22807, JIAN-XIN ZHU, Los Alamos National Laboratory, A.V. BALATSKY, Department of Physics and Astronomy, James Madison University, Harrisonburg, VA 22807 — DNA methylation plays a pivotal role in the genetic evolution of both embryonic and adult cells.Unusual methylation on CPG islands are identified as the prime causes for silencing the tumor suppressant genes. Early detection of such methylation can diagnose the potentially harmful oncogenic evolution of cells, and provide a promising guideline for cancer prevention.We propose a detection technique and calculate the transport current through punctured graphene as the cytosine and methylated cytosine translocate through the nanopore. We also calculate the transport properties for uracil and cyano-cytosine to compare. Our calculations of transmission, current and tunneling conductance show distinct signatures in their spectrum for each molecular type. Our theoretical study provides a next generation detection technique for identifying DNA methylation using graphene based nanopore device.

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