Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Nanowire-nanopore transistor sensor for DNA detection during translocation PING XIE, Harvard University, QIHUA XIONG, Nanyang Technological University Singapore, YING FANG, National Center for Nanoscience and Technology China, QUAN QING, CHARLES LIEBER, Harvard University — Nanopore sequencing, as a promising low cost, high throughput sequencing technique, has been proposed more than a decade ago. Due to the incompatibility between small ionic current signal and fast translocation speed and the technical difficulties on large scale integration of nanopore for direct ionic current sequencing, alternative methods rely on integrated DNA sensors have been proposed, such as using capacitive coupling or tunnelling current etc. But none of them have been experimentally demonstrated yet. Here we show that for the first time an amplified sensor signal has been experimentally recorded from a nanowire-nanopore field effect transistor sensor during DNA translocation. Independent multi-channel recording was also demonstrated for the first time. Our results suggest that the signal is from highly localized potential change caused by DNA translocation in none-balanced buffer condition. Given this method may produce larger signal for smaller nanopores, we hope our experiment can be a starting point for a new generation of nanopore sequencing devices with larger signal, higher bandwidth and large-scale multiplexing capability and finally realize the ultimate goal of low cost high throughput sequencing.

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Date submitted: 12 Nov 2010 Electronic form version 1.4