

Abstract Submitted
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Improving signal-to-noise performance for DNA translocation in solid-state nanopores at MHz bandwidths¹ BARTHOLOMEUS MACHIELSE², ADRIAN BALAN³, DAVID NIEDZWIECKI, Univ of Pennsylvania, JIANXUN LIN, PELJIE ONG, Columbia University, REBECCA ENGELKE, Univ of Pennsylvania, KENNETH SHEPARD, Columbia University, MARIJA DRNDIC, Univ of Pennsylvania — DNA sequencing using solid-state nanopores is impeded by the relatively high noise and low bandwidth of the current state-of-the-art translocation measurements. We measure the ion current noise through Si_3N_4 nanopores at bandwidths up to 1 MHz. At these bandwidths, the input-referred current noise is dominated by the amplifier's voltage noise acting across the total capacitance at the amplifier input. By reducing the nanopore membrane capacitance we are able to transition to a regime in which current noise is dominated by the effects of the capacitance of the amplifier itself. Advances in bandwidth and signal-to-noise ratio necessary for DNA sequencing will require lower capacitance devices as well as new amplifier designs with reduced input capacitance and noise characteristics.

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