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Determining the thermal noise floor of graphene biosensors[1]
MICHAEL CROSSER, Linfield College, MORGAN BROWN, ETHAN MINOT, Oregon State University — The use of graphene field-effect transistors (GFETs) as biosensors in aqueous environments is fundamentally limited by voltage noise. In many GFET devices, noise is dominated by the fluctuating occupancy of charge traps in the substrate. Fabrication techniques have been found to reduce this substrate effect, but thermally-driven charge transfer across the graphene liquid interface has yet to be quantified and addressed. In this report we present the first characterization of this noise source. We show that the power spectral density of this noise scales inversely with frequency and inversely with interface area. Our results are in quantitative agreement with recent measurements of voltage noise in clean, suspended graphene.

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