



FIG. S1:  $1/f$ -like response of the QPC transducer. The current spectral density of the QPC with DC source-drain bias is plotted for a larger frequency range than in Fig.4(a). The QPC response to the thermal motion of the cantilever tip is shown as black (red) points for  $V_{sd} = 2.0$  mV ( $V_{sd} = 0.2$  mV) DC. The black (red) line shows the corresponding white noise floor calculated from the contributions of amplifier noise, Johnson noise, and QPC shot noise. A 6 dB band-pass filter set between 300 Hz and 10 kHz accounts for the low frequency roll-off observed here.