Shuttle and Electrode Displacement Output Voltage  $\begin{array}{c} x_1 \text{ (Shuttle)} \\ x_2 \text{ (Electrode)} \end{array}$ 10 0.04 Displacement  $(\mu m)$ 5 Voltage  $V_{out}$  (mV) 0.02 0 0.00 -5-0.02-0.04-100.25 0.30 0.35 0.30 0.35 0.20 0.40 0.20 0.25 0.40 Collision Force Damping Force 0.075 0.075 0.050 0.050 Force  $F_c$  ( $\mu$ N) Force  $F_d$  ( $\mu$ N) 0.025 0.025 0.000 0.000-0.025-0.025-0.050-0.050-0.075-0.0750.30 Time t (s) 0.30Time t (s) 0.25 0.25 0.35 0.40 0.20 0.35 0.40 0.20