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Supporting Information

for

Cantilever signature of tip detachment during contact resonance AFM

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Hypothetical simulations with NNMs

Table S1: Parameter values for hypothetical simulation example

Parameter	Value
L ($\gamma = L_1/L$)	300 µm (0.97)
L_{bD}	$0.1 \cdot L$
h	4 µm
b	20 µm
ρ	2330 kg·m^{-3}
E	169 GPa
ν	0.278
R	10 nm
E_{sample}	10 GPa
ν_{sample}	0.3
F_{Adh}	20 nm
g_{adh}	10 nm
P	1.5 (Hertz)
Q	100
F_{TS}	200 nN

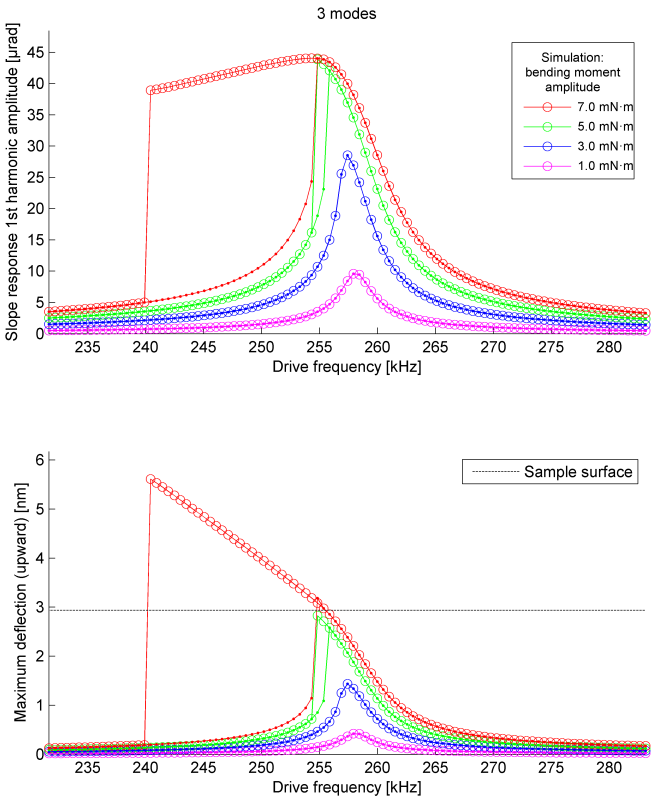

Figure S1: Dynamic simulations of a hypothetical cantilever system (parameter values in Table 1) driven about contact resonance frequency using only three free cantilever eigenfunctions as a basis set. Slope response first harmonic amplitude versus drive frequency (upper) and maximum probe displacement versus drive frequency (lower).

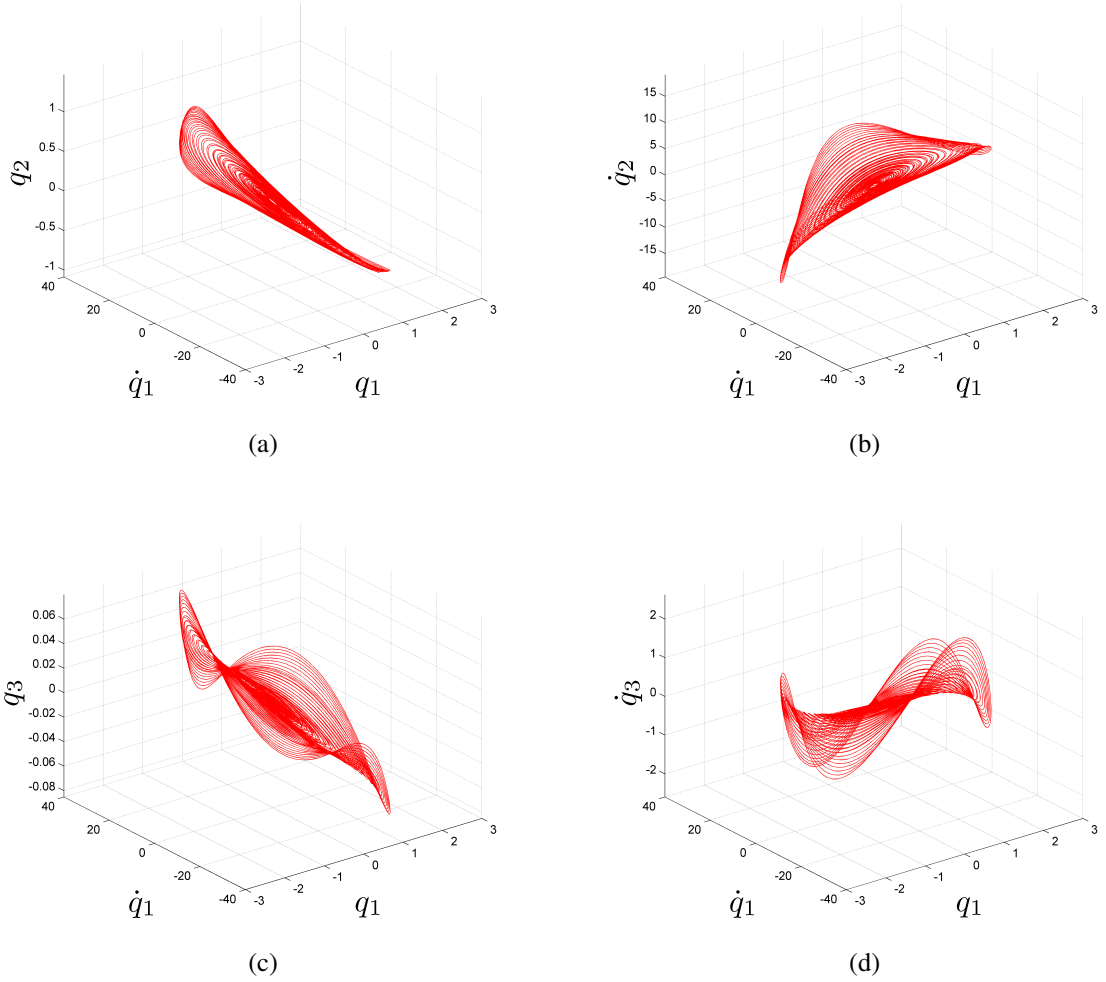

Figure S2: Steady-state periodic orbits (nonlinear normal modes) from hypothetical simulations (parameter values in Table 1) in Figure 1 projected onto phase space comprised of state variables. Second basis function displacement q_2 (a) and velocity $\dot{q}_2$ (b), as well as third basis function displacement q_3 (c) and velocity $\dot{q}_3$ (d) are plotted against first basis function displacement q_1 and velocity $\dot{q}_1$.