Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information for "Parametric Strong Mode-Coupling in Carbon Nanotube Mechanical Resonators"

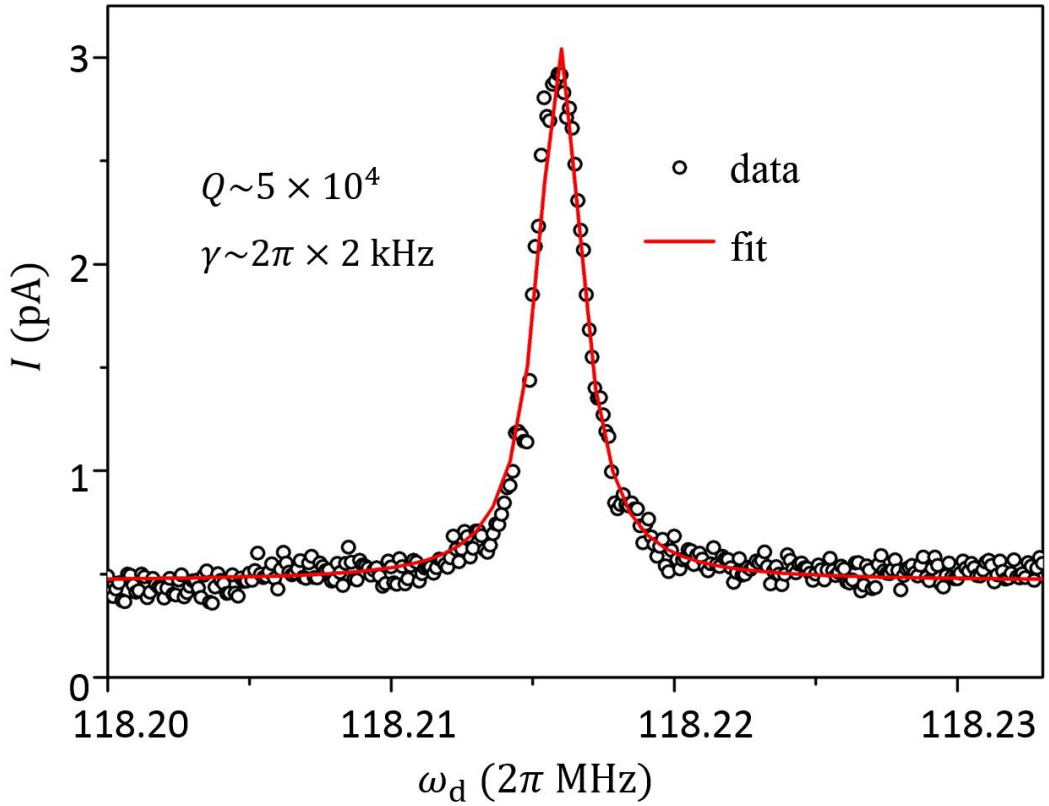

Fig. S1: Fitting the current response as a function of the driving frequency. The curve is fitted by $\Delta I(\omega) = B \frac{\omega_0^4/Q^2}{(\omega_0^2-\omega^2)^2+\omega_0^2\omega^2/Q^2}$,[S1] where B is a fit parameter. We show typical fitting results at -40 dBm, obtaining the quality factor $Q \sim 5 \times 10^4$ and the decoherence rate $\gamma = \omega_0/Q \sim 2\pi \times 2$ kHz.

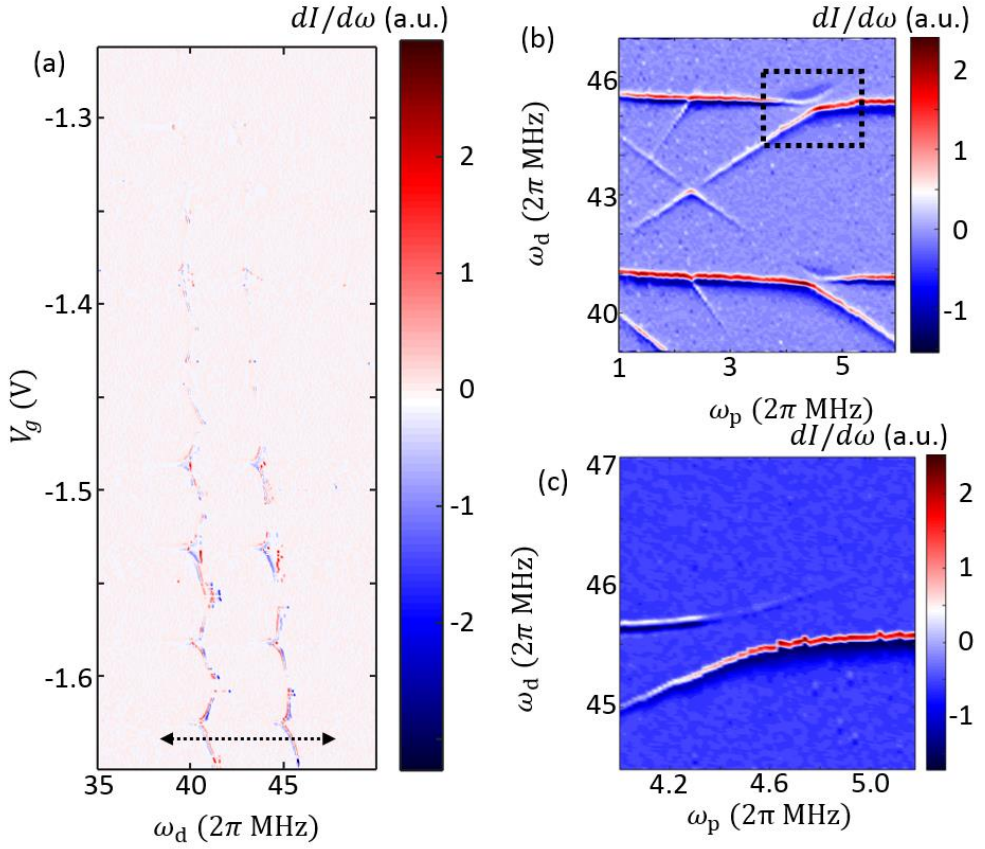

Fig. S2: Two modes coupling for another device. (a) Transport property as a function of gate voltage and driving frequency, where the driving power is -50 dBm. For better resolution, we show the frequency differential results here. (b) Transport property as a function of driving frequency and parametric pump frequency, each with a power of -50 and -30 dBm. The gate voltage is fixed at -1.63 V, shown as the black arrow in (a). Avoided mode splitting is observed in both mechanical resonance, with the pump frequency near 4.6 MHz. (c) Zoom of the black dashed box in (b), and the pump power is -28 dBm.

S1. Meerwaldt, H. B.; Labadze, G.; Schneider, B. H.; Taspinar, A.;

Blanter, Y. M.; van der Zant, H. S. J.; Steele, G. A. Phys. Rev. B 2012, 86, (11).