Figures

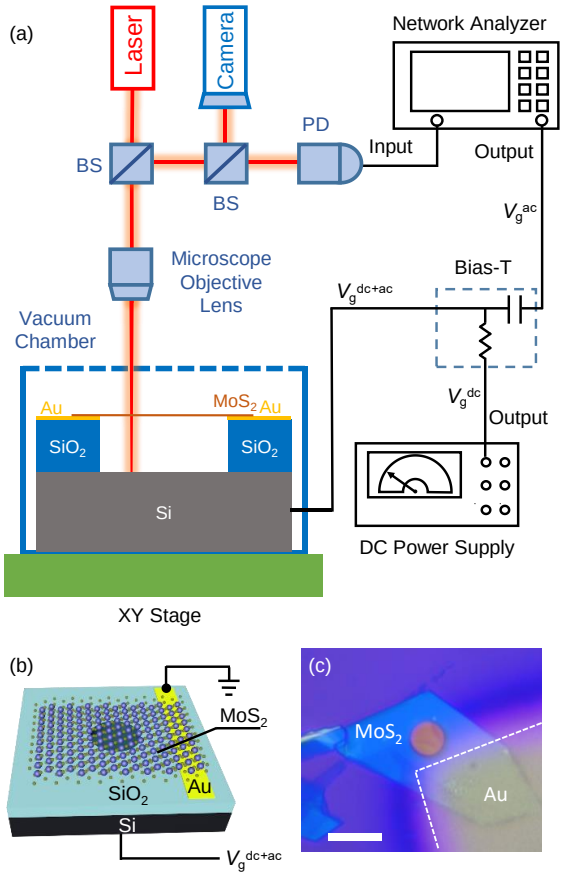

Fig. 1: Measurement setup and MoS_2 drumhead resonator device structure. (a) Schematic of the optical interferometry measurement setup. (b) Schematic illustration of the MoS_2 resonator. (c) Optical image of a MoS_2 drumhead resonator with contact electrode. *Scale bar*: 10 μm.

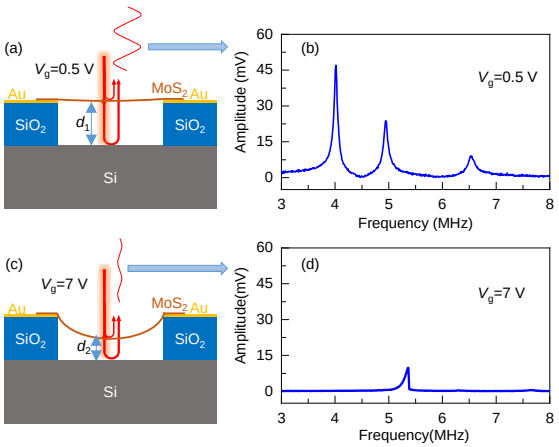

Fig. 2: Illustration of the gate tuning effect on interferometry responsivity and measurement data of the MoS_2 resonator. (a) Cross section of the device, showing the air gap at 0.5 V gate voltage (V_g), and (b) corresponding resonance data. (c-d) Same as (a-b) but with 7 V V_g.

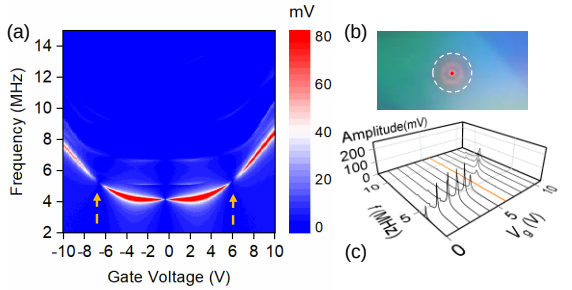

Fig. 3: Visualizing the responsivity with the laser spot at the center of the MoS_2 resonator. (a) 2D color plot showing resonances at different V_g, (b) optical image showing the laser position at the center of the MoS_2, and (c) line plots for 0–10 V gate voltages. The orange arrows in the 2D color plot and the orange trace in the line plot indicate where the responsivity is zero, *i.e.*, the device motion can be hardly measured.

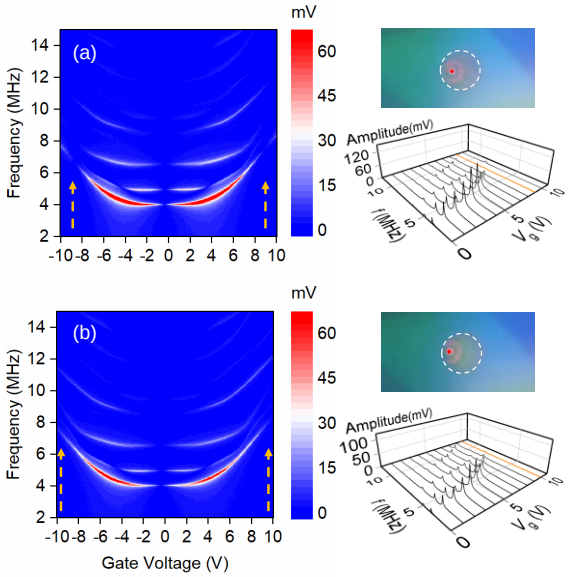

Fig. 4: Tuning and visualizing the responsivity, by moving the laser spot (a) towards the side, and (b) at the edge of the MoS_2 resonator.

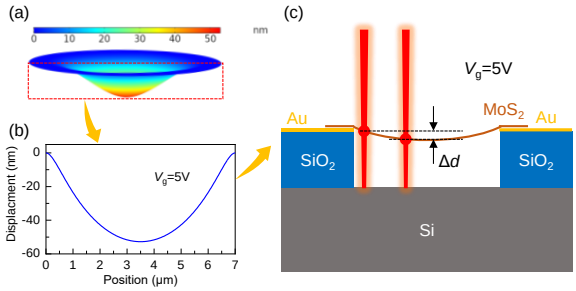

Fig. 5: Illustration of location effect on laser interferometry. (a) Finite element simulation of the MoS_2 deflection under 5 V V_g. (b) Deflection profile of the device in the red dashed box in (a). (c) Illustration of location effect on responsivity.