

Fig. 1 Device fabrication flow using the dry-transfer method. (a) Cleaning the pre-patterned substrate. (b) Aligning PDMS stamp with exfoliated WSe₂ flake to the substrate, before engaging the glass slide towards the substrate. (c) When the PDMS disengages, the WSe₂ flake remains on the substrate and seals the microtrench. (d) The resulting device with sealing the microtrench and contacted by the electrodes.

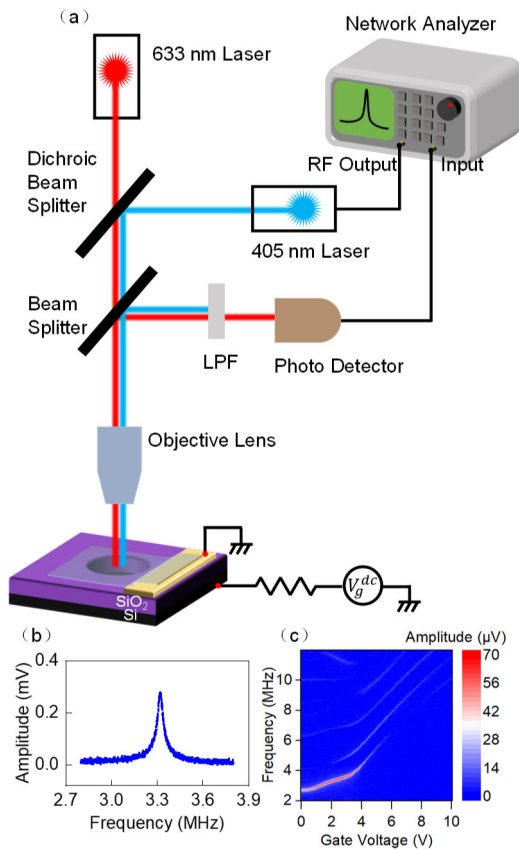


Fig.2 Optical excitation and optical readout of mechanical vibration in WSe₂ Resonator and frequency tuning. (a) Measurement setup. (b) Resonant response. (c) 2D color plot of the amplitude-frequency response under different gate voltages.

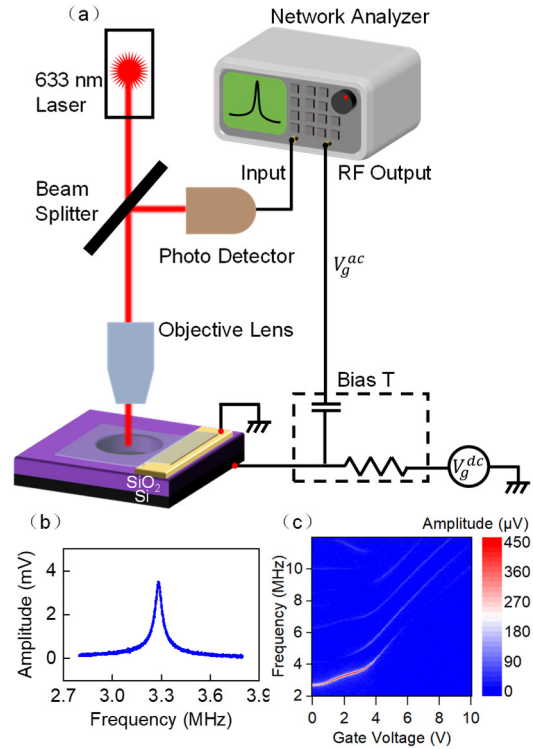


Fig.3 Electrical excitation and optical readout of mechanical vibration in WSe₂ resonator and frequency tuning. (a) Measurement setup. (b) Resonant response. (c) 2D color plot of the amplitude-frequency response under different gate voltages.

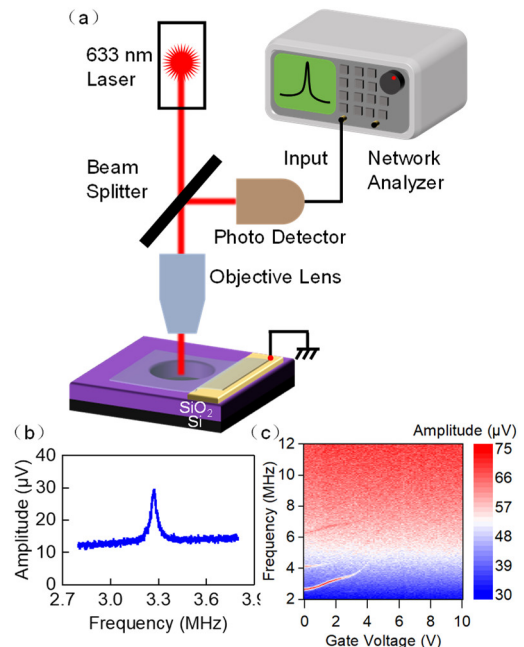


Fig.4 Thermomechanical measurement of WSe₂ resonator. (a) Measurement setup. (b) Measured thermomechanical resonant response in the noise spectrum. (c) Thermomechanical resonant response under different gate voltages.