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Electric-field tuning phonon in single layer WS2 YILING YU, YIFEI YU, ALPER GURARSLAN, LINYOU CAO, North Carolina State Univ, LINYOU CAO'S GROUP TEAM — The physical properties of two-dimensional semiconductor materials play crucial role in realizing next generation electronic and optoelectronic devices. In this work, we observe a dramatic change in Raman spectrum for single layer WS2 under external electric field. The intensity of Raman peak will increase or decrease for different direction of bias voltages. This indicates we can tune the optical phonon behavior by external electric field and enable a strong electron-phonon coupling in the single layer WS2. Our results can provides new physical understanding to electron-phonon coupling to two dimensional material systems, and suggest a potential promising way to control thermal conductivity of layered materials through external electric field, which is very interesting to both basic physics and device applications.

Yiling Yu
North Carolina State Univ

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