

FIG. 1. (Color online) The phonon band dispersions of CaAlGaSe<sub>4</sub> monolayer by using GGA.

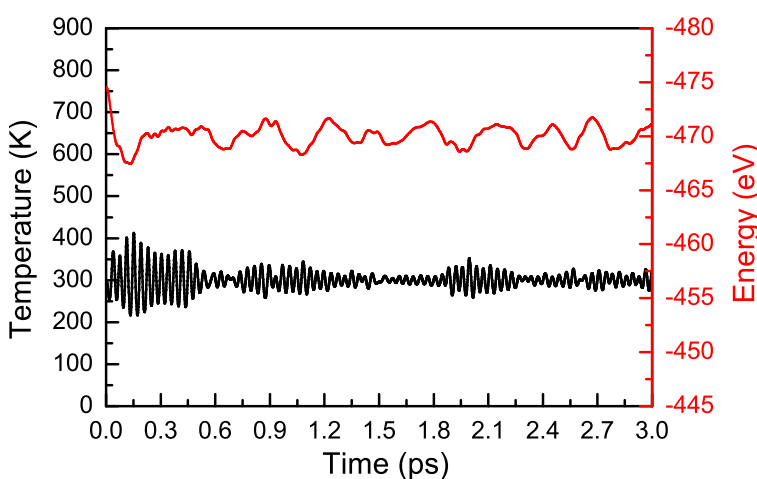


FIG. 2. (Color online) The temperature and total energy fluctuations of CaAlGaSe<sub>4</sub> monolayer at 300 K.

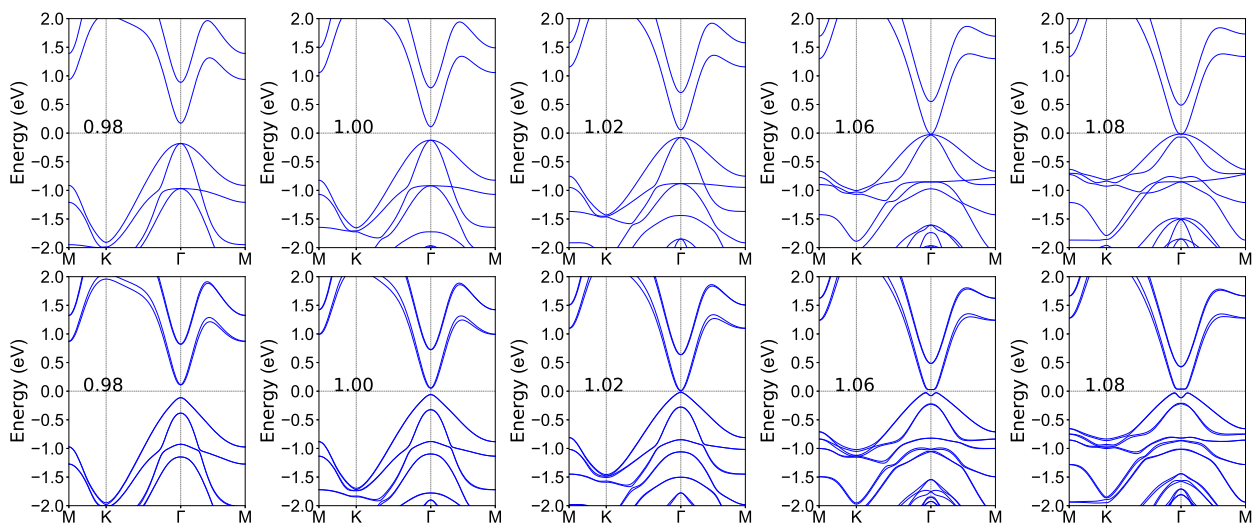


FIG. 3. (Color online) The energy band structures of CaAlGaSe<sub>4</sub> monolayer using GGA (Top) and GGA+SOC (Bottom) at representative 0.98, 1.00, 1.02, 1.06 and 1.08 strains.

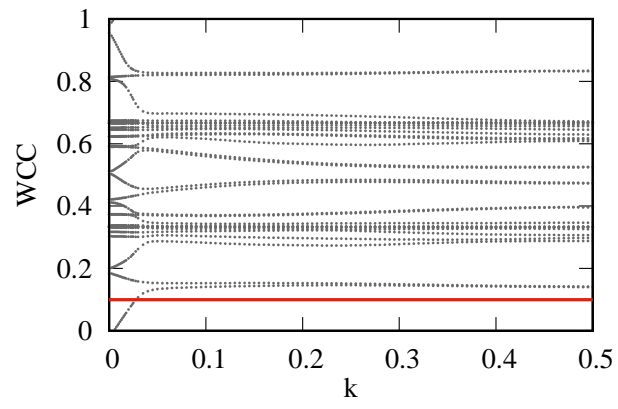


FIG. 4. (Color online) Evolution of WCC of  $\text{CaAlGaSe}_4$  monolayer at 1.06 strain.

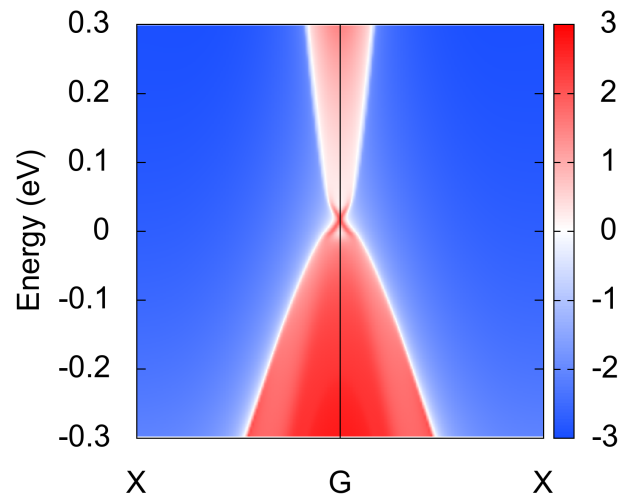


FIG. 5. (Color online) The edge states of semi-infinite  $\text{CaAlGaSe}_4$  under 1.06 strain.