

Abstract Submitted  
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**Phonons in Bi<sub>2</sub>Te<sub>3</sub> and Bi<sub>2</sub>Se<sub>3</sub> Thin Films** SHANG-FEN REN,  
Illinois State University, WEI CHENG, Beijing Normal University — Bi<sub>2</sub>Te<sub>3</sub> and  
Bi<sub>2</sub>Se<sub>3</sub> are topological insulators with interesting surface properties that have at-  
tracted great research attention in recent years. In this research, phonon dispersion  
curves and phonon density of states of Bi<sub>2</sub>Te<sub>3</sub> and Bi<sub>2</sub>Se<sub>3</sub> thin films with five atomic-  
layers are calculated by Medea-VASP program, and thermal dynamic functions are  
also analyzed. Phonon results of these two thin films are compared with each other  
and are also compared with available bulk measurements. Symmetry broken is found  
in the Brillouin zone center phonon modes.

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