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Is Sodium a Superconductor Under Pressure? ROXANNE TUTCHTON, The Colorado School of Mines, XIAO-JIA CHEN, The Carnegie Institution of Washington, ZHIGANG WU, The Colorado School of Mines — Superconductivity has been discovered in compressed Li with a critical temperature (T_c) of 14 K. The other alkali metals are, theoretically, predicted to become superconductors under pressure. Sodium (Na) is the notable exception. Previous *ab initio* calculations considered superconductivity only in the BCC and FCC structures of alkali metals; however, Na goes through complicated, structural phase transitions at higher pressures until it becomes an insulator around 260 GPa. We have performed first-principles linear response calculations for four metallic phases (BCC, FCC, cI16 and tI19) of Na to compute lattice dynamics and the electron-phonon spectral function. The electron-phonon coupling parameter as well as T_c were then determined as functions of pressure. Our results suggest that the critical temperature for Na rises with increasing pressure to a maximum T_c of 1.2 K in the cI16 phase, then it decreases rapidly to zero K at higher pressures.

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