Electron-phonon superconductivity and charge density wave instability in the layered titanium-based pnictide $BaTi_2Sb_2O$

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I present the results of first-principles calculations of the phonon dispersions and electron-phonon coupling for $BaTi_2Sb_2O$. The phonon dispersions show a weak lattice instability near the zone corners that leads to a charge-density wave phase. The calculations of the electron-phonon coupling reveal strong coupling, especially to the in-plane Ti modes. The total coupling is large enough to readily explain the superconductivity in this compound. As the Fermi surfaces are disconnected with different orbital character weights, this compound is likely to host a multiband superconductivity.