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Mechanical properties of Ge nanowire ALEX LEE, MINJUNG KIM, JAMES CHELIKOWSKY, The University of Texas at Austin — Nanowires possess unique properties owing to their low dimensionality and high surface-to-volume ratio. Although numerous calculations exist for the electronic properties of nanowires, the mechanical properties have not been addressed to the same extent. Here, we present real-space pseudopotential calculations for the mechanical properties of Ge nanowires. In particular, we examine three different orientations of Ge nanowires, with the axis along the [111], [110], and [100] directions. We present calculations for the elastic properties as a function of wire diameter. We find that Young's modulus is decreased as the surface-to-volume ratio increases, except for the [110] orientation, which shows the opposite trend. In addition, we will discuss the band structure under strain for each nanowire system.

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