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Controlling thermal and electrical properties of graphene by strain-engineering its flexural phonons HIRAM CONLEY, RYAN NICHOLL, KIRILL BOLOTIN, Department of Physics and Astronomy, Vanderbilt University — We explore the effects of flexural phonons on the thermal and electrical properties of graphene. To control the amplitude of flexural phonons, we developed a technique to engineer uniform mechanical strain between 0 and 1% in suspended graphene. We determine the level of strain, thermal conductivity and carrier mobility of graphene through a combination of mechanical resonance and electrical transport measurements. Depending on strain, we find significant changes in the thermal expansion coefficient, thermal conductivity, and carrier mobility of suspended graphene. These changes are consistent with the expected contribution of flexural phonons.

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