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Superfluid ^{4}He phases on strained graphene NATHAN NICHOLS, VALERI KOTOV, ADRIAN DEL MAESTRO, University of Vermont — We have investigated the low temperature phases of ^{4}He adsorbed on a suspended graphene sheet under uniaxial strain via large scale quantum Monte Carlo simulations. The mechanical deformation of the substrate can modify the induced dipolar (van der Waals) interactions between helium atoms and the surface. The resulting potential can be tuned to exhibit significant spatial anisotropy which is reflected in the commensurate structure of the first adsorbed layer of helium. As the chemical potential is increased, a second layer is adsorbed, and we observe signatures of anisotropic superfluidity with enhanced flow in the zigzag direction. We discuss implications for the experimental observation of this novel two dimensional quantum liquid.

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