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Magneto-transport and Strain Experiments in Anisotropic High Mobility van der Waals Semiconductor YUCHEN DU, GANG QIU, YIXIU WANG, WENZHUO WU, PEIDE YE, Purdue University, INDUSTRIAL ENGINEERING COLLABORATION, ELECTRICAL AND COMPUTER ENGINEERING COLLABORATION — The current research on low dimensional materials is mainly based on 2D material, which the materials are composed of atomic interaction along in-plane x and y directions, and van der Walls forces along out-of-plane vertical z direction. Some 2D materials, such as black phosphorus/phosphorene and $ZrTe_5$ we have been intensively studying, are anisotropic in x-y plan due to their unique atomic structures, which lead to anisotropic transport, optical, thermal and mechanical properties. In this work, we present an extreme case in anisotropy in van der Walls materials. Multiple experimental methods have been introduced to verify and study its anisotropic van der Walls properties including orientation dependent low temperature magneto-transport, polarized Raman spectroscopy, and mechanic strain experiments.

Yuchen Du
Purdue University

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