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Quantum Hall effect in few-layer black phosphorus devices: beyond the Hall bar geometry.[1] RUOYU CHEN, SON TRAN, JIAWEI YANG, Univ of California - Riverside, KENJI WATANABE, TAKASHI TANIGUCHI, National Institute for Materials Science, Japan, DMITRY SMIRNOV, National High Magnetic Field Laboratory, Tallahassee, FL, CHUN NING LAU, Univ of California - Riverside — As a member of two-dimensional (2D) material family, few- layer black phosphorus (FLBP) has attracted intensive interests recent years. One reason is its high mobility compared with other 2D semiconductors, which allowed the recent observation of quantum Hall effect in conventional Hall bar geometries. Careful studies of quantum Hall effect in different device geometries lead us to further understandings of this material, and here we will present our effort with advanced geometry. High quality dual-gated FLBP devices form a tunable wide quantum well with ambipolar charge densities, and integer quantum Hall effect states on both surfaces. In van der pauw devices, we observe the discrepancy between different current flow directions that may be related to the structural anisotropy of FLBP.

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