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Topological phase transition from trigonal warping in van der Waals multilayers JUNJIE ZENG, YAFEI REN, ZHENHUA QIAO, University of Science and Technolgy of China — We investigate theoretically in Bernal-stacked bilayer graphene system the effect of the trigonal warping, which stems from the interlayer hopping, upon distinctive topological phases, such as the quantum anomalous Hall effect as well as the quantum valley Hall effect. We find that the trigonal warping plays a vital part in the formation of topological phases in large exchange field and/or interlayer potential difference by changing Chern numbers. The presence of the trigonal warping terms shrinks the phase space of quantum anomalous/valley Hall effect and leads to the emergence of the valley-polarized quantum anomalous Hall effect with high Chern numbers ranging from C = -7 to 7. Inspired by those findings, we believe that, in a larger sense, it is auspicious for other van der Waals layer-structured materials to possess similar constructive effect under the considerations alike.

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