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Dimerization-Induced Fermi Surface Reconstruction in $IrTe_2$
MANJIN EOM, KYOO KIM, Department of Physics, Pohang University of Science and Technology, Pohang 790-784, Korea, YOUN JUNG JO, Department of Physics, Kyungbook National University, Daegu 702-701, Korea, JUNJIE YANG, Laboratory for Pohang Emergent Materials, Pohang University of Science and Technology, Pohang 790-784, Korea, EUN SANG CHOI, National High Magnetic Field Laboratory, Florida State University, Tallahassee, Florida 32310, USA, BYUNG IL MIN, JAE-HOON PARK, Department of Physics, Pohang University of Science and Technology, Pohang 790-784, Korea, SANG-WOOK CHEONG, Rutgers Center for Emergent Materials and Department of Physics and Astronomy, Piscataway, New Jersey 08854, USA, JUN SUNG KIM, Department of Physics, Pohang University of Science and Technology, Pohang 790-784, Korea — We report a de Haas-van Alphen (dHvA) oscillation study on $IrTe_2$ single crystals showing complex dimer formations. By comparing the angle dependence of dHvA oscillations with band structure calculations, we show distinct Fermi surface reconstruction induced by a 1/5-type and a 1/8-type dimerizations. This verifies that an intriguing quasi-two-dimensional conducting plane across the layers is induced by dimerization in both cases. A phase transition from the 1/5-type to the 1/8-type dimerizations reveals that local instabilities associated with intra- and inter-dimer couplings are the main driving force for complex dimer formations in $IrTe_2$.

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