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Signature of Instability of Chiral Fermion in Ultraquantum Weyl Semimetal TaAs CHENGLONG ZHANG, BING-BING TONG, ZHUJUN YUAN, SHUANG JIA, CHI ZHANG, Peking University — In the compound of Tantalum Monoarsenide (TaAs), the novel Weyl fermions are hosted. In our high mobility single crystal samples, the Shubnikov-de Haas oscillations are distinct below the quantum limit (B ˜10 T). Beyond the quantum limit, within the configuration-B (electric field E // B-fields), we observed the novel quantum phase transitions in the ρ_{zz}-measurements, which may come from the nesting of the vector over a wide range of B-T plane. Due to the similarity to those observed density wave phases or the excitonic states in three-dimensional graphite semimetal, the novel phase may from many body effect beyond the quantum limit. However, in the other measurements (R_{xx} in configuration-A: E $\perp$ B-fields), the novel quantum phase transition does not exist. In general, our results on the density wave phase support its non-trivial topological order.

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