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Multi-orbits observed in superconducting Nb-doped Bi_2Se_3 BENJAMIN LAWSON, PAUL CORBAE, GANG LI, FAN YU, TOMOYA ASABA, COLIN TINSMAN, Univ of Michigan - Ann Arbor, YUNSHENG QIU, YEW SAN HOR, Missouri University of Science and Technology, LU LI, Univ of Michigan - Ann Arbor — Recently discovered superconducting niobium doped Bi_2Se_3 shows promise to realize new physical phenomenon including the coexistence of superconductivity and magnetic ordering and possibly topological superconductivity. To understand the new physics showcased in this system, a detailed knowledge of the electronic structure is needed. We present the first observation of quantum oscillations in the magnetization (the de Haas-van Alphen effect) of Nb-doped Bi_2Se_3. In the fully superconducting crystal, two distinct orbits are observed, in sharp contrast to Bi_2Se_3, Cu-doped Bi_2Se_3, and Sr-doped Bi_2Se_3. The multiple frequencies observed in our quantum oscillations, combined with our electrical transport studies, indicate the multi-orbit nature of the electronic state of Nb-doped Bi_2Se_3.

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