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SdH oscillations and pressure effect of the Weyl semimetal NbAs

YONGKANG LUO, Los Alamos National Laboratory, Los Alamos, NM 87545, USA, N. J. GHIMIRE, Argonne National Laboratory, Argonne, Illinois 60439, USA, M. WARTENBE, HONGCHUL CHOI, M. NEUPANE, R. D. MCDONALD, E. D. BAUER, JIANXIN ZHU, J. D. THOMPSON, F. RONNING, Los Alamos National Laboratory, Los Alamos, NM 87545, USA — Via angular Shubnikov-de Hass (SdH) quantum oscillations measurements, we determine the Fermi surface topology of NbAs. The SdH oscillations consist of two frequencies, corresponding to two Fermi surface extrema: 20.8 T (α-pocket) and 15.6 T (β-pocket). The analysis shows that the β-pocket has a Berry phase of π and a small effective mass 0.033 m_0, indicative of a nontrivial topology; whereas the α-pocket has a trivial Berry phase of 0 and a heavier effective mass 0.066 m_0. Subtle changes can be seen in the $\rho_{xx}(T)$ profiles with pressure up to 2.31 GPa. The Fermi surfaces undergo an anisotropic evolution under pressure, while the topological features of the two pockets remain unchanged. Specific heat measurements reveal a small Sommerfeld coefficient γ_0 =0.09(1) mJ/(mol•K^2) and a large Debye temperature, Θ_D =450(9) K, confirming a "hard" crystalline lattice that is stable under pressure. We also studied the Kadowaki-Woods ratio of this low-carrier-density massless system, R_{KW} =$3.210^4\Omega$ cm $mol^2K^2J^{-2}$. After accounting for the small carrier density in NbAs, this R_{KW} indicates a suppressed transport scattering rate relative to other metals. **References:** [1] N. J. Ghimire *et al.*, J. Phys.: Condens. Matter **27**, 152201 (2015) [2] Y. Luo *et al.*, arXiv: 1506.01751 (2015) [3] Y. Luo *et al.*, arXiv: 1510.08538 (2015)

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