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Proving nontrivial topology of pure bismuth by quantum confinement SUGURU ITO, BAO-JIE FENG, ISSP, University of Tokyo, MASASHI ARITA, HiSOR, AKARI TAKAYAMA, University of Tokyo, RO-YA LIU, TAKASHI SOMEYA, ISSP, University of Tokyo, WEI-CHUAN CHEN, NSRRC, TAKUSHI IIMORI, ISSP, University of Tokyo, HIROFUMI NAMATAME, MASAKI TANIGUCHI, HiSOR, CHENG-MAW CHENG, NSRRC, SHU-JUNG TANG, National Tsing Hua University, FUMIO KOMORI, ISSP, University of Tokyo, KATSUYOSHI KOBAYASHI, Ochanomizu University, TAI-CHANG CHIANG, University of Illinois, IWAO MATSUDA, ISSP, University of Tokyo — The topology of pure bismuth (Bi) has been controversial due to its extreme electronic structures [1,2]. The three-dimensional Dirac-like dispersion is so sharp against a momentum resolution expected in usual angle-resolved photoelectron spectroscopy (ARPES) that the bulk bands have never been clearly observed [1]. This is a serious problem because the band gap of Bi is very small (10 meV [2]) and a slight energy shift in bulk bands can easily transform a topologically nontrivial case into a trivial case. In the present study, we overcame these difficulties by performing high-resolution ARPES measurements on Bi(111) films with thicknesses increasing from 14 to 202 bilayers. Detailed analyses on the phase shift of the confined wave functions precisely determined the surface and bulk electronic structures, which unambiguously show nontrivial topology. [1] Y. Ohtsubo *et al.*, New J. Phys. 15, 033041 (2013). [2] L. Aguilera *et al.*, PRB 91, 125129 (2015). [3] S. Ito *et al.*, PRL in press, arXiv1605.03531.

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