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Electronic structure and strain-induced Lifshitz transition in epitaxial Ba_2RuO_4 thin films as studied by ARPES BULAT BURGANOV, CAROLINA ADAMO, DANIEL SHAI, ANDREW MULDER, MASAKI UCHIDA, JOHN HARTER, CRAIG FENNIE, DARRELL SCHLOM, KYLE SHEN, Cornell University — We employ oxide molecular beam epitaxy and *in situ* ARPES to synthesize epitaxial thin films of Ba_2RuO_4, which is isostructural and isoelectronic to the unconventional superconductor Sr_2RuO_4, and characterize its Fermi surface topology and multiorbital quasiparticle dynamics. Although Ba_2RuO_4 cannot be synthesized as bulk single crystals, we epitaxially stabilize thin films on $TbScO_3$ or $SrTiO_3$ substrates. We report a full parametrization of the band structure and compare our results to first-principles calculations as well as our data on Sr_2RuO_4. Unlike in Sr_2RuO_4 we do not observe a surface reconstruction in line with our expectations for the larger Ba cations. We use ARPES to demonstrate that the combination of a larger cation radius, together with epitaxial strain, can be employed to drive a Lifshitz transition in the d_{xy}-like γ band from electron-like in Sr_2RuO_4 to hole-like in Ba_2RuO_4. The ability to control the Fermi surface topology by epitaxial strain is a promising tool for investigating the role of the near-E_F van Hove singularity in superconductivity and magnetism in ruthenates, as well as a general tool for controlling and studying correlated electronic materials.

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