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Suppression of ferromagnetism and observation of quantum well states in epitaxial thin films of the cubic ruthenate $BaRuO_3$. BULAT BURGANOV, Department of Physics, Cornell University, HANJONG PAIK, Department of Materials Science and Engineering, Cornell University, KYLE SHEN, Department of Physics, Cornell University, DARRELL SCHLOM, Department of Materials Science and Engineering, Cornell University — The pseudocubic perovskite ruthenates $ARuO_3$, where A is alkaline earth metal, are correlated materials where Hund's coupling drives correlations and leads to a low coherence scale, large renormalization, and formation of local moments. The ferromagnetic $BaRuO_3$ has an ideal cubic structure and a larger bandwidth, compared to its $GdFeO_3$-distorted counterparts, $CaRuO_3$ and $SrRuO_3$. In stark contrast to $SrRuO_3$, which is a Fermi liquid below T_C, $BaRuO_3$ exhibits critical fluctuations near T_C that are enhanced under hydrostatic pressure, which suppresses the Fermi liquid coherence scale and T_C and drives a crossover into non-FL regime. Here we use ARPES to characterize the momentum-resolved electronic structure of strained ultrathin $BaRuO_3$ films grown in situ by molecular beam epitaxy. The films on STO (001) are metallic down to 2 u.c. thickness and manifest clearly defined subbands of well-defined quasiparticles which arise due to quantum confinement effects. We observe that the bands are moderately renormalized compared to bare GGA bands and discover that the ferromagnetism can be suppressed in the atomically thin limit. We discuss our results on $BaRuO_3$ in the context of our recent ARPES studies of the other perovskite ruthenates, $SrRuO_3$ and $CaRuO_3$.

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