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Strongly-correlated 2D electron state by surface deposition in Sr_2IrO_4[1] ILYA BELOPOLSKI, Princeton University — Strong electron correlations in crystals often play a more important role in lower dimensions. Here we use in situ potassium surface deposition to create a 2D strongly-correlated electronic state at the surface of Sr_2IrO_4. This compound is unusual because bandwidth, Coulomb repulsion and spin-orbit coupling are at comparable energy scales. In related compounds, it has been predicted that these competing interactions can give rise to exotic states such as a Weyl semimetal or an oxide topological insulator. Here, we use angle-resolved photoemission spectroscopy (ARPES) to study how the electron states in Sr_2IrO_4 change as a result of potassium deposition. We observe the formation of new electron states, which may be interpreted as a Rashba band splitting near the sample surface. Such a spin-textured surface electron state is unusual in a strongly-correlated compound. This result may allow us to realize novel strongly-correlated electron states by taking advantage of large spin-orbit coupling.

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