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**Unusual Band Dispersion in Pb Films on Si(111)** M.H. UPTON, T. MILLER, T.-C. CHIANG, University of Illinois at Urbana-Champaign — Uncommon effects are observed in thin films, in part because the influence of the substrate is measurable. Atomically uniform Pb films are prepared on Si(111), and the quantum well states corresponding to confined valence electrons in the film are probed by angle-resolved photoemission. The subband structure shows a free-electron-like dispersion near the zone center, but the dispersion turns sharply toward higher binding energies at larger in-plane momenta. The effective mass at the zone center shows large variations of up to a factor of seven, and in one instance, the sign of the effective mass is reversed. These anomalous results are explained in terms of the bulk band structures of Pb and Si and an anticrossing coupling.

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