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Utilizing Electronic Coherence to Probe a Deeply Embedded Quantum Well in Bimetallic Pb/Ag Films on Si(111) MATTHEW BRINKLEY, YANG LIU, NATHAN SPEER, THOMAS MILLER, TAI-CHANG CHIANG, University of Illinois at Urbana-Champaign — We report an experiment in which we utilize electronic coherence to probe a deeply embedded thin film as a quantum well. An atomically uniform Ag film prepared on Si(111) was covered by Pb films up to 70 Å thick, and the resulting electronic structure was examined by angle-resolved photoemission spectroscopy. Despite a photoemission escape depth of just a few Ångströms and an incommensurate Pb/Ag interface, the data reveal a striking Fabry-Pérot-like structure characteristic of an Ag etalon buried deeply under the Pb overlayers. Our simulations clearly illustrate the manifest coherence of the electronic structures, permitting the characterization of the embedded Ag quantum well.

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