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Influence of quantum well states on homo-epitaxy of Pb on ultra-thin Pb films¹ JISUN KIM, ALEXANDER KHAJETOORIANS, CHIH-KANG SHIH, The University of Texas at Austin — Pb on the Si(111) surface is a well-investigated system, partly because of its unique electronic properties. Due to the nearly half-integer matching between the Fermi wavelength and the inter-layer spacing, many properties of Pb films, including thermodynamic stability, exhibit bi-layer quantum oscillations. Here we study epitaxial growth of Pb overlayers on such films. We start with flat-top Pb mesas on Si(111) exhibiting a range of thicknesses including both quantum stable and unstable thicknesses. We then investigate the behavior, nucleation, and growth of 2D Pb nanoislands on such quantum films. Issues of kinetics are investigated by controlling the annealing temperatures. We examine these results in the context of recent investigations of adsorbates on Pb quantum films.

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