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STM investigation of quantum size effect on adsorption and reactivity of different gases and alkali metals on thin Pb films[1] ALEXANDER KHAJETOORIANS, SHENGYONG QIN, MURAT OZER, CHIH-KANG SHIH, The University of Texas at Austin; Department of Physics — Recent work has shown that the Quantum Size Effect (QSE) plays a critical role in the catalytic behavior in reactivity. More specifically, the presence of quantum well states in thin metal systems can have profound effects on surface reactivity. Epitaxial thin Pb films on Si(111) are well known to exhibit pronounced QSE manifested by the phase matching of the Fermi wavelength and the layer thickness, giving rise to bilayer oscillation as well as a re-entrant quantum beats of longer periodicity. Such quantum oscillation phenomena have been observed in preferred film thickness, the location of quantum well states, as well as superconductivity. This work focuses on studies of adsorption and surface reactivity of different gases (hydrogen, oxygen and carbon monoxide) and alkali metal on thin Pb films grown on Si(111) surface.

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