PHOTOEMISSION STUDIES OF QUANTUM WELL SYSTEMS WITH VICINAL INTERFACES

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The electronic structures of thin metallic films on semiconductor surfaces have been shown to be profoundly influenced by the films’ interfaces with the substrate and with the vacuum. As seen using synchrotron-based angle-resolved photoemission spectroscopy, well-ordered systems grown on low-index faces may exhibit discrete electronic spectra characteristic of quantum wells [1]. In turn, the quantized electronic structure has been observed to impact various physical properties of the film [2]. Vicinal surfaces possess periodic arrangements of steps which influence the growth and development of adsorbate structures [3], and thus may produce systems with electronic properties that differ from those formed with substrates oriented along a high symmetry axis [4]. Currently, we are probing the surface and quantum well states arising in Ag/vicinal Si(111) and Ag/vicinal Si(001) systems, with an eye towards developing an understanding of their electronic and physical properties. In this regard, comparison to the existing results from the simpler on-axis systems should prove useful.

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