

Absence of Dirac cones in monolayer silicene and multilayer Si films on Ag(111)

S. K. Mahatha

*Istituto di Struttura della Materia, Consiglio Nazionale delle Ricerche,
Trieste, Italy*

Abstract

Honeycomb structured (4×4) monolayer silicene and ($\sqrt{3}\times\sqrt{3}$)R30° multilayer silicon on Ag(111) have attracted a lot of interest with photoemission studies indicating the presence of π -band Dirac cones near the Fermi level.^{1,2} In this talk, I will show instead that the π -symmetry states of monolayer silicene lose their local character and the Dirac cones fade out. An interface state of free-electron-like Ag origin accounts for the spectral features that were attributed to silicene π -bands.^{3,4} For multilayer silicon, the bands previously attributed to π^* state with Dirac fermion character are found to derive from the well-known Ag-($\sqrt{3}\times\sqrt{3}$)R30°-Si(111) structure, and from a Si modified Ag(111) interface states.^{5,6}

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Present address: Department of Physics and Astronomy, Aarhus University, DK-8000 Aarhus C,