

Supplementary information for: Coexistence of massive and massless charge carriers in an epitaxially strained alkali metal quantum well on graphene

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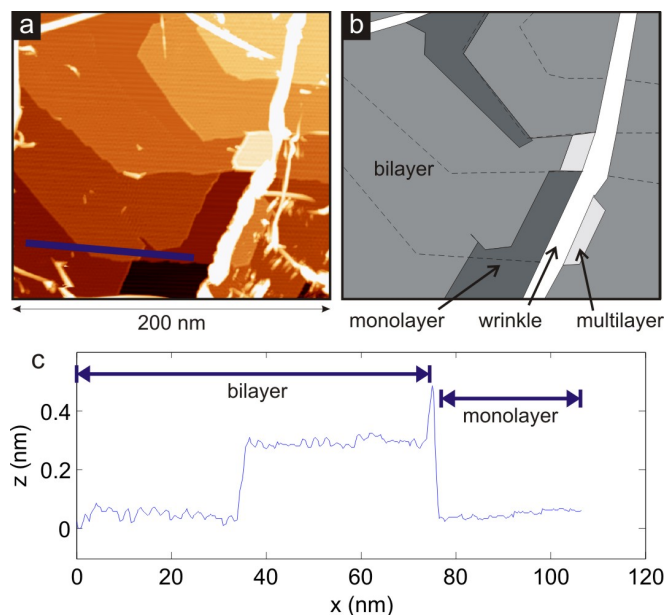
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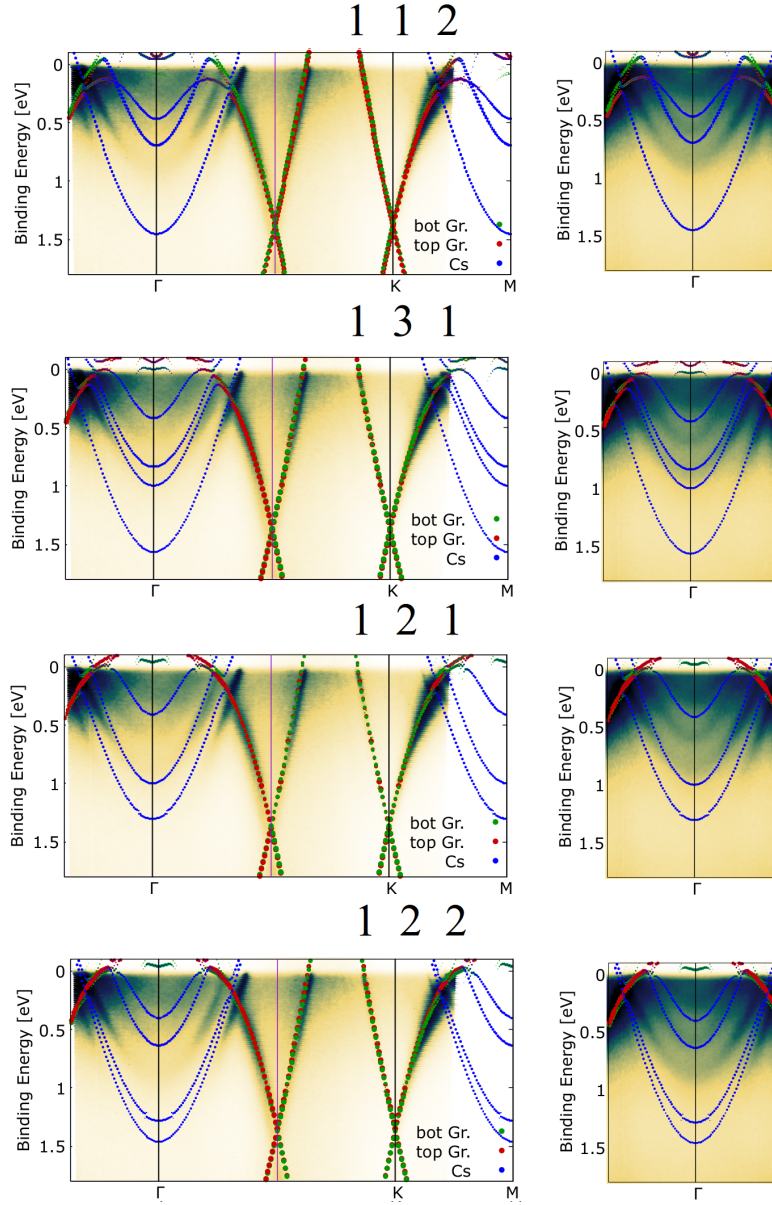
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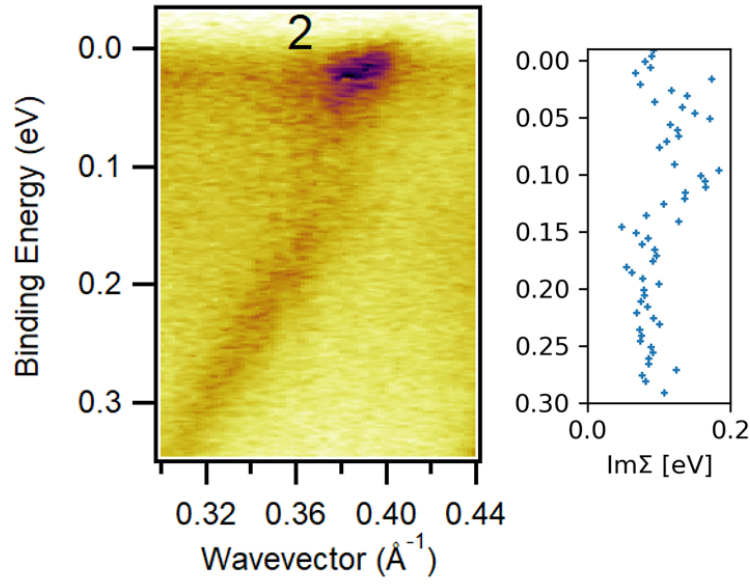
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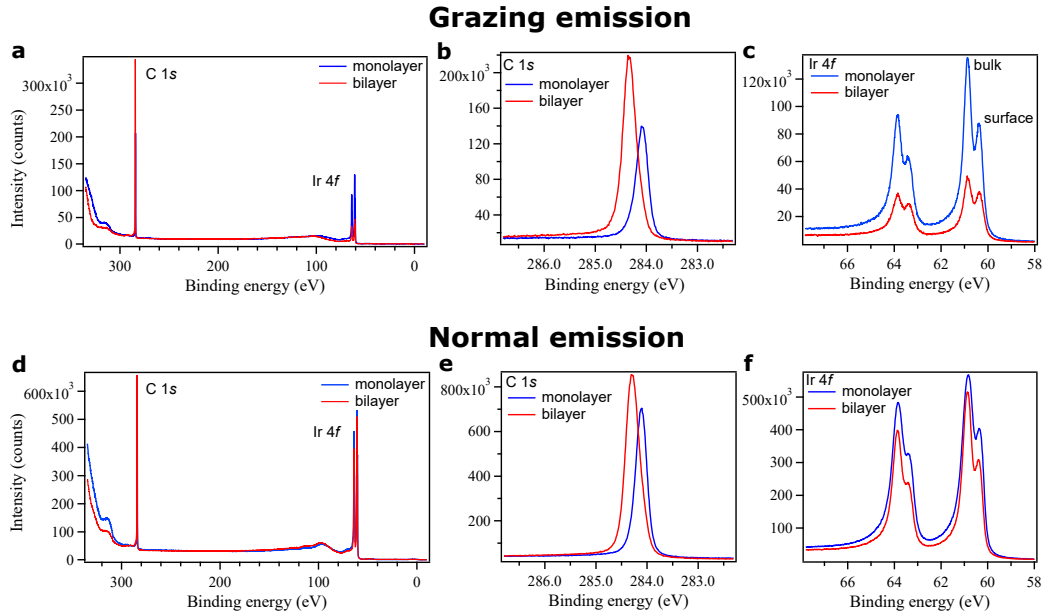
Supplementary Figure 1: STM across a region with monolayer and bilayer graphene present. (a) STM image of bilayer graphene on Ir(111). (b) Schematic representation of (a): step edges of the Ir(111) substrate are marked with dashed lines. Thick white lines denote wrinkles in the graphene layers. From dark to light gray: monolayer, bilayer and multilayer graphene. (c) Line cut along the blue line defined in (a). Monolayer and bilayer regions are identified based on the varying corrugation, which is large (small) for bilayer (monolayer) graphene.



Supplementary Figure 2: ARPES spectra of Cs quantum wells grown on intercalated graphene. Comparison of theoretical calculation of various ℓmn structures to ARPES data of the Cs quantum well and graphene electronic structure.



Supplementary Figure 3: Self-energy analysis of ARPES data. Analysis of $\Im\Sigma(E)$ of quantum well state 2.



Supplementary Figure 4: XPS spectra of monolayer graphene and bilayer graphene. Upper panel: XPS spectra of monolayer graphene (blue) and bilayer graphene (red) taken in grazing emission (60° relative to the surface normal); (a) overview spectrum, (b) C1s spectrum and (c) Ir4f spectrum. Lower panel (d-f): same as in the upper panel but the spectra are taken in normal emission. All spectra are taken at a photon energy $h\nu=370\text{eV}$.