

Electronic Supplementary Information: Few-monolayer Ga film on Si(111): Illusive gallenene formation and localization instead of superconductivity

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1. Structural features of the second-layer $\sqrt{7}\times\sqrt{7}$ -Ga film

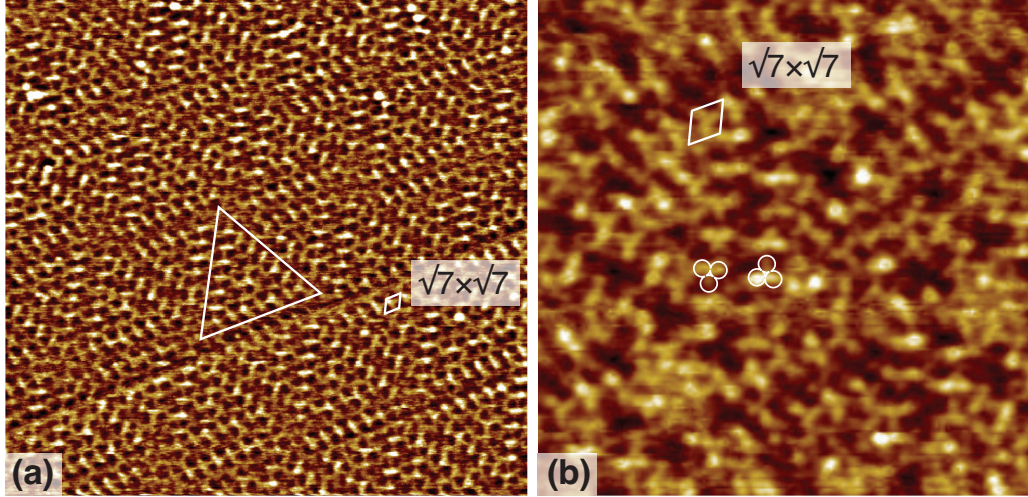


Figure 1S: (a) Large-scale ($40\times 40\text{ nm}^2$) and (b) close-up ($14\times 14\text{ nm}^2$) STM images of the second-layer $\sqrt{7}\times\sqrt{7}$ -Ga surface acquired at 100 K. The $\sqrt{7}\times\sqrt{7}$ unit cells are outlined by the rhombuses. The triangle in (a) outlines the characteristic domain of the structure having a size of $\sim 9\text{ nm}$. The groups of three circles in (b) indicate the characteristic three-adatom configurations in two possible orientations.

One can distinguish a number of the characteristic features in the structure of the second-layer $\sqrt{7}\times\sqrt{7}$ -Ga film. At the large scale, this is occurrence of the triangular domains arranged in the network (Fig. 1S (a)). The domains have a size of about 9 nm, but they are not exactly identical and their stacking is not perfect enough to form a long-range superstructure with of $9\sqrt{7}\times 9\sqrt{7}$ periodicity. In the close-up view, one can notice the characteristic three-adatom configurations (Fig. 1S (b)) predicted by the structural model (Fig. 4). They form the $\sqrt{7}$ -periodic stripes preferentially along the boundaries of the triangular domains, while the interior of the domains is less ordered.