Exotic forms of low-dimensional epitaxial silicon and Xenes

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Résumé

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Silicene, the silicon counterpart of graphene, but with a remarkable Quantum Spin Hall effect [1], has generated very strong interest, since its initial synthesis by epitaxy on Ag(111) in 2012 [2]. It has further boosted research on related elemental low-dimensional materials coined Xenes. Typically, two-dimensional (2D) Kagome silicene [3], pentagonal 1D Si chiral nanoribbons [4]and 0D symmetric nanodots [4,5], as well as nearly flat 2D germanene [6] and stanene [7] with unique characteristics, have been artificially created on different substrates.

Quickly, the electronic properties of silicene have been exploited in ultra-thin planar devices: field-effect transistors with a monolayer silicene channel have been already fabricated in 2015 [8,9].

In my talk, I will present these realizations and draw perspectives for future research and potential applications.

References:


Y. Sassa et al., to be submitted.


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**Fig 1.** Left: The "flower pattern" of two-dimensional single-layer silicene epitaxially grown on silver (111) surfaces. Right: Massively parallel, chiral, one-dimensional penta-silicenelike nanoribbons epitaxially grown on silver (110) surfaces.