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### Structural and Electronic Properties of Atomically Thin Bismuth on Au(111)

Bingchen He , Guo Tian , Jian Gou , Baoxing Liu ,  
Kongchao Shen , Qiwei Tian , Zhengqing Yu , Fei Song ,  
Haipeng Xie , Yongli Gao , Yunhao Lu , Kehui Wu , Lan Chen ,  
Han Huang

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## Highlights

- At coverage less than 1 ML, Bi atoms self-assemble into the cluster array with  $(5 \times 5)$  periodicity,  $(\sqrt{37} \times \sqrt{37})R25.3^\circ$  in a Kagome lattice and  $(p \times \sqrt{3})$  stripes, sequentially.
- The  $(5 \times 5)$  periodicity is a low temperature ( $<100$  K) phase and behavior as gas at room temperature.
- The results reveal the Van der Waals interaction between Au (111) and Bi adatoms.
- We have optimized the small window for a stable 2D Bi in Kagome and honeycomb lattice on Au (111).

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