

Abstract Submitted
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Surface reconstruction in van der Waals heterostructures.

KOSTYA S. NOVOSELOV, COLIN R WOODS, MATTHEW HOLWILL, JAMES HOWARTH, MENGJIAN ZHU, DAVIT GHAZARYAN, YI BO WANG, ALEKSEY KOZIKOV, National Graphene Institute, University of Manchester, Oxford Road, Manchester, M13 9PL, UK, K. WATANABE, T. TANIGUCHI, National Institute for Materials Science, 1-1 Namiki, Tsukuba, 305-0044, Japan, A. K. GEIM, ARTEM MISHCHENKO, National Graphene Institute, University of Manchester, Oxford Road, Manchester, M13 9PL, UK — Van der Waals heterostructures of two-dimensional (2D) materials have already allowed realization of a number of unique devices and exciting physical experiments. Electronic properties of such heterostructures are usually fine-tuned by careful selection of the sequence and thickness of the individual layers. Recently it has been demonstrated that relative orientation between the crystals allow for fine modification of their electronic properties. Thus, spectrum reconstruction is observed for graphene on hexagonal boron nitride and indirect exciton emission is observed for aligned MoS₂ and WSe₂ flakes. Here we would like to go even further and demonstrate that such aligned structures experience surface reconstruction. Furthermore, this surface reconstruction can be controlled by external parameters, such as strain, temperature, doping, etc. This allows for even finer tuning of the electronic, optical and mechanical properties of such heterostructures.

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