

Supporting Information

Monolayer WS₂ Lateral Homosuperlattices with Two-dimensional Periodic Localized Photoluminescence

Wanli Yang,^{†,¶} Tiantian Huang,[†] Junbo He,[†] Shuaijun Zhang,[†] Yan Yang,[†]
Weiming Liu,[†] Xun Ge,[†] Rui Zhang,[†] Mengxia Qiu,[†] Yuxiang Sang,[†] Xingjun
Wang,[†] Xiaohao Zhou,[†] Tianxin Li,[†] Congfeng Liu,[†] Ning Dai,^{†,‡,¶} Xin Chen,^{*,†,‡}
^{‡,¶} Zhiyong Fan,^{*,§} Guozhen Shen,^{*,‡,¶}

[†]National Laboratory for Infrared Physics, Shanghai Institute of Technical
Physics, Chinese Academy of Sciences, Shanghai 200083, China

[‡]State Key Laboratory of Superlattices and Microstructures, Institute of
Semiconductors, Chinese Academy of Sciences, Beijing 100083, China

[§]Department of Electronic and Computer Engineering, The Hong Kong
University of Science and Technology, Kowloon, Hong Kong SAR, China

[‡]Hangzhou Institute for Advanced Study, University of Chinese Academy of
Sciences, Hangzhou 310024, China

[¶] University of Chinese Academy of Sciences, Beijing 100049, China

*Corresponding Authors:

xinchen@mail.sitp.ac.cn, eezfan@ust.hk, gzshen@semi.ac.cn

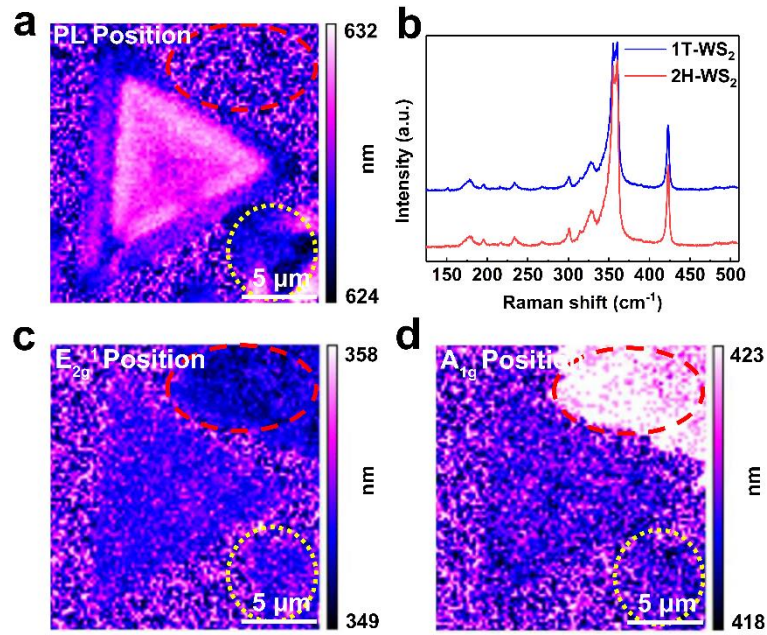


Figure S1. (a) Position map of photoluminescence for the 2D MLHS with 1T/2H-WS₂ in Figure 3c. (b) Raman spectra of the 1T and 2H phases of WS₂. (c, d) Raman position map of the E_{2g}¹ and A_{1g} phonon modes respectively, corresponding to the 2D MLHS with 1T/2H-WS₂ in Figure 3e.

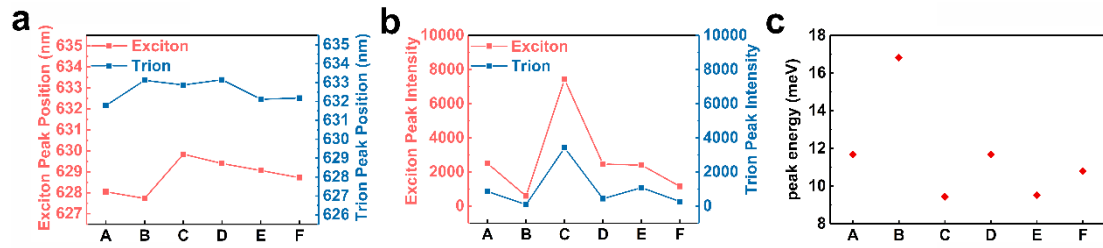


Figure S2. Variation of excitons and trions with alternating 1T and 2H phases according to the Lorentz fitting curves (Figure 4b). (a) Exciton (red) and trion (blue) peak position profiles at positions A-F in Figure 3c. (b) Exciton (red) and trion (blue) intensity profiles at positions A-F in Figure 3c. (c) Binding energy of the trion in Figure 4b.