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**Floquet-Bloch state of bulk $WSe_2$ by time-resolved angle-resolved photoemission spectroscopy** RO-YA LIU, YU OGAWA, University of Tokyo, PENG CHEN, UnivofIllinoisatUrbana Champaign , MSARU OKADA, TAKASHI SOMEYA, YUKIAKI ISHIDA, KOZO OKAZAKI, SHIK SHIN, University of Tokyo, TAI-CHANG CHIANG, UnivofIllinoisatUrbana Champaign, IWAO MATSUDA, University of Tokyo — Light-matter interaction in novel materials has attracted much attention recently. Pumped by a strong laser field, a non-equilibrium electronic state, Floquet-Bloch (FB) state may occur in crystals [1]. As an extension of photon dressed states in gas molecules to crystals, FB states show the same band dispersion of the ground state bands with energy spacings equal to integer multiples of the pump photon energy. In this study, the FB states of the valence bands near the K point of bulk 2H-phase $WSe_2$ are observed by time- and angle-resolved photoemission spectroscopy (TRARPES). The probe pulse is generated by high harmonic generation (28 eV) and the pump pulse is delivered by a femtosecond laser with a wavelength of 800 nm. The replica bands at E + h$\nu$ and E - h$\nu$ for the two topmost valence bands are observed within 120 fs, which reflects the cross correlation between the pump and probe pulses. Laser-assisted photoemission (LAPE) is another possible mechanism to generate replica bands in TRARPES. By changing the polarization of the pump pulse from p- to s-polarization, the contribution from LAPE decreases to zero; thus, the replica bands observed with s-polarization are pure FB state. [1] Wang, Y. H., Steinberg, H., Jarillo-Herrero, P. and Gedik, Science 342, 453 (2013)

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