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Fermi loop in interface states and surface flat bands in diamond lattice models RYUJI TAKAHASHI, SHUICHI MURAKAMI, Tokyo Institute of Technology — Previously we have shown the gapless interface states between two topological insulators with different chiralities by means of the mirror Chern number [1]. In this presentation we use the Fu-Kane-Mele tight-binding model on diamond lattice *with* the spin-orbit interaction, and calculate their gapless interface states. We find that when the particle-hole symmetry is imposed in the whole system the Fermi surface of the gapless states becomes a loop in the interface Brillouin zone. We show how to characterize the existence of such Fermi loop in terms of topology. Next we report flat band states in the surface of the diamond lattice model with anisotropic hopping integrals *without* the spin-orbit interaction. When anisotropy is not so strong, the surface flat band exists in some part of the Brillouin zone. Moreover when the anisotropy becomes sufficiently strong, the surface flat bands cover the whole surface Brillouin zone. [1] R. Takahashi, S. Murakami, Phys. Rev. Lett. 107,166805 (2011).

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