

Abstract Submitted  
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**Crystalline topological insulators in ultrashort optical pulse<sup>1</sup>**  
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MAN, georgia state university — We study theoretically interaction of ultrastrong  
and ultrashort optical pulse with crystalline topological insulators, which have  
quadratic band degeneracy at the surface. Coherent electron surface dynamics  
in such optical pulse is determined by interband dipole coupling, which is highly  
anisotropic in these materials. Within two-band k.p model of the surface states of  
topological insulator the electron dynamics is describe in terms of the mixing of two  
(valence and conduction) bands. Such mixing is characterized by residual, i.e., after  
the pulse, conduction band population. Residual electron momentum distribution  
in the conduction band is highly anisotropic and follows the profile of the interband  
dipole coupling. Depending on polarization of the optical pulse, the residual con-  
duction band population has one or two strong peaks in the momentum space, where  
the shapes of the peaks change with the amplitude of the pulse. The conduction  
band population is almost one at these peaks.

<sup>1</sup>Crystalline topological insulators in ultrashort optical pulse

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