

Abstract Submitted  
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**Optical Second Harmonic Generation Study of Topological Insulator  $\text{Bi}_{2-x}\text{Sb}_x\text{Se}_3$** <sup>1</sup> JISUN KIM, ZHENYU ZHANG, MATTHEW T. CURTIS, LOUIS H. HABER, RONGYING JIN, Louisiana State University — Second-order nonlinear optical spectroscopy such as second harmonic generation (SHG) is well-established and versatile technique for surface and interface studies. We apply this technique to study the surface symmetry of topological insulator  $\text{Bi}_{2-x}\text{Sb}_x\text{Se}_3$  in reflection geometry under four possible polarization configurations. By measuring the azimuthal angular dependence of SHG from the (111) surface of  $\text{Bi}_{2-x}\text{Sb}_x\text{Se}_3$  single crystals, we identify responses from both in-plane Se-Se bonds and out-of-plane Se-Bi/Sb bonds. This provides us information about the doping effect on the surface crystalline structure, which is critical for understanding the surface properties. The transition from topological to trivial insulator upon Sb doping will be discussed based on SHG data. Future work using sum frequency generation on these crystals will be considered as well.

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