Topological States on InBi Crystal Surface

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Abstract. The ongoing research in topologically protected electronic states is driven not only by the obvious interest from a fundamental perspective but is also fuelled by the promising use of these non-trivial states in energy technologies such as the field of spintronics. It is therefore important to find new materials exhibiting these compelling topological features. InBi has been known for many decades as a semi-metal in which Spin-Orbit Coupling (SOC) plays an important role. SOC plays a key role for emergence of novel topological states. Here we present a thorough analysis of InBi, grown on InAs(111)-A surface, both, experimental by Angular-Resolved PhotoEmission Spectroscopy (ARPES) measurements and theoretical by fully-relativistic *ab-initio* electronic band calculations. We found existence of topologically non-trivial metallic surface states due to formed Bi bilayer with fundamental role of Bi within these electronic states. Moreover, InBi appears to be a topological crystalline insulator whose Dirac cones at the (001) surface are pinned at high-symmetry points. Consequently, as they are also protected by time-reversal symmetry, they can survive even if the in-plane mirror symmetry is broken at the surface.