

Abstract Submitted  
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**Unconventional band structure for a periodically gated surface of a three dimensional Topological Insulator**<sup>1</sup> SANKALPA GHOSH<sup>2</sup>, PUJA MONDAL<sup>3</sup>, Physics Department, IIT Delhi, New Delhi-110016, India — The surface states of the three dimensional (3D) Topological Insulators are described by two-dimensional (2D) massless dirac equation. A gate voltage induced one dimensional potential barrier on such surface creates a discrete bound state in the forbidden region outside the dirac cone. Even for a single barrier it is shown such bound state can create electrostatic analogue of Shubnikov de Haas oscillation which can be experimentally observed for relatively smaller size samples. However when these surface states are exposed to a periodic arrangement of such gate voltage induced potential barriers, the band structure of the same got nontrivially modified. This is expected to significantly alters the properties of macroscopic system. We also suggest that in suitable limit the system may offer ways to control electron spin electrostatically which may be practically useful

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