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**Nodal-line and nodal-surface semimetals in multilayers of a topological insulator and a normal insulator** KOKIN NAKAJIN, Dept. of Physics, Tokyo Tech.; CREST, JST., SHUICHI MURAKAMI, Dept. of Physics, Tokyo Tech.; TIES, Tokyo Tech.; CREST, JST. — Phase diagram having topological insulator (TI) and normal insulator phases in multilayer of TI and insulator was reported. We introduce a multilayer, consisting of alternating layers of two type TIs and a normal insulator. We modulate the sign of the velocity of the surface Dirac cones of TI alternately. We find new phase diagram having topological nodal line semimetal (TNS) phase, which is different from a previous research. In addition, the TNS phase has nodal line and it is protected by the internal symmetry and Kramers theorem. Interestingly by breaking inversion symmetry, there appears a nodal surface in our multilayer system. Furthermore, we also discuss about the origin of the TNS phase by imposing the warping term to change system symmetry. We show that thus such multilayer exhibit various topological semimetal phases including.

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