Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Topological phases in multilayers of a Weyl semimetal and a normal insulator KAZUKI YOKOMIZO, Dept. of Phys. Tokyo Tech., SHUICHI MURAKAMI, Dept. of Phys. Tokyo Tech., TIES. Tokyo Tech — We investigate multilayer systems of a normal insulator and a Weyl semimetal. We calculate the bulk band structure and determine phase diagrams by changing the thickness of the normal insulator and that of the Weyl semimetal layer using two models; one is from the effective model for a Weyl semimetal, and the other is the lattice model. We compare the results between the two models, and found that they agree well. As a result, we find that the multilayer system shows a qualitatively different behavior depending on the stacking direction relative to the displacement vector connecting between two Weyl nodes. When the stacking direction is perpendicular to the displacement vector, the Weyl semimetal and the normal insulator phases appear only. On the other hand, when it is parallel to the displacement vector, the phase diagram is rich, containing not only the Weyl semimetal phases but also the quantum anomalous Hall phases with different Chern numbers. Furthermore, the phase transition can be understood in terms of the trajectory of the Weyl nodes.

Kazuki Yokomizo
Dept. of Phys. Tokyo Tech

Date submitted: 10 Nov 2016 Electronic form version 1.4