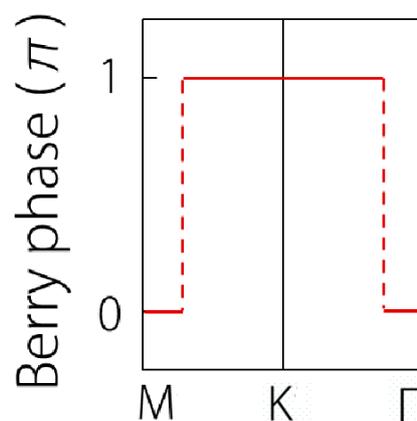


# Perfect Topological Metal CrB<sub>2</sub>: A One-Dimensional (1D) Nodal Line, a Zero-Dimensional (0D) Triply Degenerate Point, and a Large Linear Energy Range

## 1. Berry Phase Calculation

To capture the nature of the nodal lines, the Berry phase was computed, where the Berry phase was connected to the occupied Bloch band [1,2]. The result is shown in Figure S1. Obviously, the Berry phase experienced a jump around the nodal line in the  $k_z = 0$  plane.



**Figure S1.** The Berry phase along the M–K– $\Gamma$   $k$ -path for closed nodal line.

## References

1. Wan, X., Turner, A.M., Vishwanath, A., & Savrasov, S. Y. (2011). Topological semimetal and Fermi-arc surface states in the electronic structure of pyrochlore iridates. *Physical Review B*, 83(20), 205101.
2. Burkov, A. A., Hook, M. D., & Balents, L. (2011). Topological nodal semimetals. *Physical Review B*, 84(23), 235126.



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