Significant recent effort has been devoted in understanding the geometric aspects of condensed matter [1]. Marrying topology and magnetism, particularly at interfaces leveraging disparate quantum features, constitutes an exciting arena for developing novel energy efficient memory, logic and information technologies. We herein introduce molecular beam epitaxially (MBE) grown magnetic transition metal chalcogenide Cr2Te3 as an emerging platform for spin-orbit driven Berry phenomena [2]. A unique temperature and strain modulated sign reversal of the anomalous Hall effect has been discovered and attributed to nontrivial Berry curvature physics. The versatile interface tunability of Cr2Te3, when hybridized with a topological insulator, offers new designs for topological devices [3]. Furthermore, we observe nonreciprocity in supercurrent transport and demonstrate strong field-free superconducting diode effect in magnetic insulator/superconductor bilayers [4]. These heterostructures enable new computing regime with intrinsically low energy cost, mitigating Joule heating with dissipationless supercurrent, that is well suited for high demanding data centers. The discovery-rich magnetic surfaces and interfaces are pivotal in further advancing quantum materials and interfaces in the exciting fields of topological and superconducting spintronics.

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