Layered antiferromagnets under pressure

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Abstract

The rise of van der Waals materials opened up a new era in condensed matter and material science. After the discovery of graphene other materials including insulators, semiconductors, superconductors and topological materials have been found. The latest addition to this family was the discovery of 2D magnetic materials. These novel materials allow the development of novel spintronic devices including layered spin-valves or spin-orbit torque heterostructures.

In van der Waals heterostructures the coupling between layers often determines the behavior and the interaction strength. Pressure is a versatile tool allowing to tune the layer distance and hence the interaction strength. We have recently developed a novel system that allows the tuneability of these heterostructures without the need of special fabrication techniques [1]. We have shown that this allows to tune spin orbit strength in graphene-TMD structures [2-3], the topological properties of semimetals [4] or the band structure in twisted systems [5]. Similarly to these structures, the coupling between layers is a very sensitive knob in layered antiferromagnets.

In this poster I show our recent measurements on layered antiferromagnets including CrSBr, which is one of the most promising candidates for spintronics applications and $MnBi_2Te_4$ which is claimed to be a Chern insulator. Our results show, that pressure not only allows to tune the magnetic properties, but as well as the topological properties.

References

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