The Simplest Ferroelectric System with Non-Trivial Topology Is Paving the Way Towards Antiferromagnetic Spintronics

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Abstract. In the past few years, we observe renewed interest and development of materials with promising new breakthroughs in areas like superconductivity, spintronics and quantum computing. Of special interest are materials that possess functional properties that change material physical properties upon external fields, for example in ferroelectric or multiferroic systems. My presentation focus on simplest binary ferroelectric GeTe that serve as a model system for bottom-up study of all these phenomena. GeTe exhibits an intriguing multiple non-trivial topology in its electronic band structure due to the existence of triple-point and type-II Weyl fermions. These recent findings go well beyond the previously reported giant Rashba spin splitting which we managed to control by external fields. Finally, upon Mn-doping the material bears interesting ferrimagnetic properties, paving way to achieve a role for topological materials in spintronics.