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Edge states and topological insulating phases generated by curving a nanowire with Rashba spin-orbit coupling CARMINE ORTIX, Institute for Theoretical Solid State Physics, IFW Dresden, PAOLA GENTILE, CNR-SPIN and Università degli Studi di Salerno, Italy, SUDHAKAR PANDEY, Institute for Theoretical Solid State Physics, IFW Dresden, MARIO CUOCO, CNR-SPIN and Università degli Studi di Salerno, Italy — In this talk, I will discuss how curvature effects in low-dimensional nanomaterials can promote the generation of topological states of matter considering the paradigmatic example of quantum wires with Rashba spin-orbit coupling, which are bent in a nanoscale periodic serpentine structure. The effect of the periodic curvature generally results in the appearance of insulating phases with a corresponding novel butterfly spectrum characterized by the formation of finite measure complex regions of forbidden energies. When the Fermi energy lies in the gaps, the system displays localized end states protected by topology. These results suggest that the local curvature and the topology of the electronic states are inextricably intertwined in geometrically deformed nanomaterials.

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