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Pressure-induced superconductivity and topological quantum phase transitions in topological materials

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Superconductivity and topological quantum states are two frontier fields of research in modern condensed matter physics. The realization of superconductivity in topological materials is highly desired; however, superconductivity in such materials is far from being thoroughly investigated. In this talk, we will discuss the electronic properties of some topological materials by applying high pressure. Pressure-induced topological quantum phase transitions and superconductivity is observed in some topological materials. The superconducting transition temperature Tc increases with applied pressure and a dome like phase diagrams were observed, which provides insights into the interplay between superconductivity and topological physics. Our theoretical calculations suggest the presence of pressure-induced topological quantum phase transitions as well as a structural–electronic instability.

Keywords: Superconductivity, High pressure, Topological materials