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(I) 1D topological systems for next-generation electronics

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Topological nanowires, topological materials confined in one dimension (1D), hold great promise for robust and scalable quantum computing and low-dissipation interconnect applications, which will transform current computing technologies. To do so, research in topological nanowires must continue to improve their synthesis and properties.

In this talk, I will discuss my group's efforts to develop a high throughput and precision synthesis method to fabricate 1D topological systems (APL Materials 10, 080904 (2022)). I will highlight our studies on topological crystalline insulator SnTe nanowires and topological metal MoP nanowires and discuss their potential applications. Using SnTe nanowires as weak links in Josephson junction devices, we discover a novel superconducting phase (npj Quantum Materials 6, 61 (2021)). With MoP nanowires, we show that the resistivity scaling of MoP nanowires is superior to those of the state-of-the-art Cu interconnects and Cu alternative metals, presenting MoP as a breakthrough metal for the low-resistance interconnect applications (Advanced Materials doi:10.1002/adma.202208965 (2023)).

Keyword-1

topological materials

Keyword-2

nanowires

Keyword-3

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