VIDEO ARTICLE

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Two-Dimensional Ferroelectric Materials for Novel Computing Paradigms

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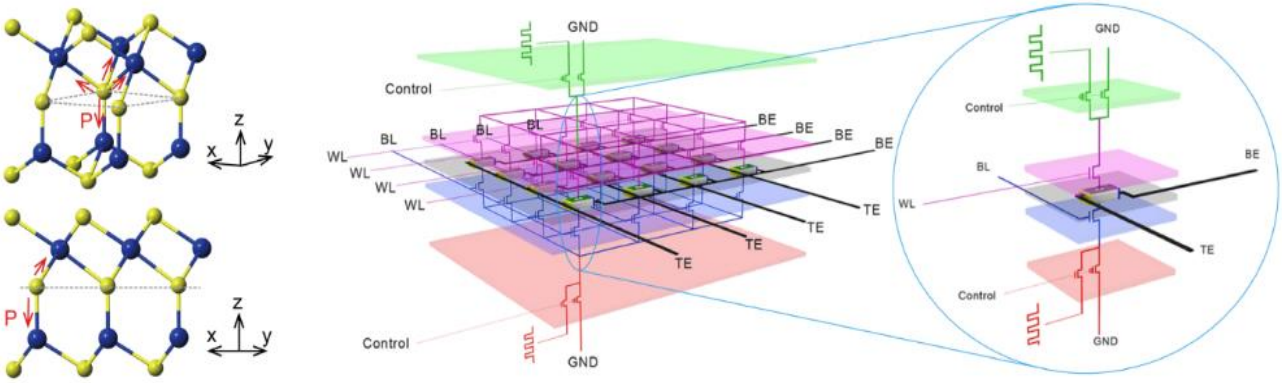
Graphical Abstract



Abstract

With the advent of Big Data and Internet-of-the-Things, massive data needs to be processed and stored within a short timeframe. This exacerbates the energy and speed costs in silicon-based mainstream hardware due to the physically separated processing and memory units. To address these issues, novel computing paradigms with parallelly processing and storing capabilities, such as neuromorphic and in-memory computing, are urgently required. Toward this goal, 2D ferroelectric material-based memory devices are excellent building blocks because of their scaled sizes, high performance, and multifunctionalities. My talk will cover our efforts in fundamental device physics related to the scalability and switching origin of 2D ferroelectric material-based memory devices, [**1-3**] as well as their novel device architectures and functionalities for next-generation computing paradigms [**4-7**].

Keywords: Van der waals ferroelectrics; memory devices; resistance switching; α-In_2Se_3; neuromorphic computing.

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Biography of Presenting Author

Fei Xue is an assistant professor at ZJU-Hangzhou Global Scientific and Technological Innovation Center and an affiliate faculty in the School of Micro-Nano Electronics at Zhejiang University. He received PhD from Chinese Academy of Sciences with Prof. Zhong Lin Wang and worked as a postdoctoral fellow in King Abdullah University of Science and Technology, Saudi Arabia. His research focuses on two-dimensional ferroelectric/piezoelectric materials and device applications. He has published 26 peer-reviewed papers including Nat. Electron., Nat. Comm., Matter, Appl. Phys. Rev., Adv. Mater. (×4), Adv. Funct. Mater. (×3), ACS Nano (×2), etc. He is an associate editor of Microelectronic Engineering (Elsevier).

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