

A call for papers is now open for the *IEEE Journal on Exploratory Solid-State Computational Devices and Circuits* special topic on “Spintronic Devices for Energy Efficient Computing”

Aims and Scope

The inherent properties of ferromagnetic materials operating at room temperature and at the nanoscale coupled with various aspects of spin physics offer abundant possibilities and functionalities for developing novel computing and memory devices and their integration. The fundamental advantage of spintronic devices over the semiconductor-based switch is its projected ultra-low operation energy through different switching mechanisms. As an example, the interplay of ferroelectric effect (charge) and ferromagnetic effect (spin) can lead to the energy efficient switching. Meanwhile, the extremely efficient charge-to-spin conversion has become promising through the integration of recently discovered topological effects (topology and chirality) and ferromagnetic effect (spin). One of the key challenges for spintronic devices, the operation speed, has been well addressed recently through the usage of antiferromagnetic materials and the application of spin-orbit-torque switching mechanism and its interplay with other switching mechanisms.

The most apparent features of spintronic devices are their non-volatility and superior endurance behavior, where spin-based devices outperform other nonvolatile devices for designing computing blocks, nonvolatile processors, logic-in-memory arrays, hyper-dimensional computing. This will enable the energy-efficient computing systems of the future.

The intrinsic multi-functionalities of spintronic devices have generated many “unexpected computing devices and architectures” in the past decade. One example is the proposal and demonstration of the usage of magnetic tunnel junctions for computing using memory, stochastic computing and probabilistic computing.

This special topic of the IEEE JXCDC will publish original recent research centered around spintronic logic and memory devices for energy efficient computing, covering the research topics from new spintronic physics, new spintronic materials, to novel spintronic devices, to spintronic circuits and spintronic computing systems.

Topics of Interest include but are not limited to:

1. Spintronic physics and theory for energy-efficient operation
2. Design, synthesis, and characterization of spintronic materials for energy-efficient operation
3. Design, modeling, fabrication and testing of energy-efficient spintronic devices
4. Design, benchmarking, building-up and testing of energy-efficient spintronic circuits
5. Design, benchmarking, integration and testing of energy-efficient spintronic systems
6. Architecture-level design for energy-efficient spintronic devices and systems
7. New applications of energy-efficient spintronic devices and systems
8. Algorithms and hardware co-design for energy-efficient spintronic systems

Review papers on the topic are also welcome.

Submission Guidelines

[The IEEE Journal on Exploratory Solid-State Computational Devices and Circuits](#)

[\(JXCDC\) IS AN OPEN ACCESS ONLY PUBLICATION](#): Charge for Authors: \$1,850 USD per paper with the following discounts:

IEEE Members receive a 5% discount.

IEEE Society Members receive a 20% discount.

These discounts cannot be combined.

Paper submissions must be done through the ScholarOne Manuscripts website:

<https://mc.manuscriptcentral.com/jxcdc>

Guidelines for papers and supplementary materials, as well as a paper template, are provided at this website (also on the next page).

Inquiries for the JxCDC Journal should be sent to: JXCDC@IEEE.ORG

Important Dates

Open for Submission: July 7th, 2022

Submission Deadline: September 5th, 2022

First Notification: September 19th, 2022

Revision Submission: October 17th, 2022

Final Decision: November 14th, 2022

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