

**IEEE Journal on Exploratory Solid-State
Computational Devices and Circuits (JXCDC)**
**Special Issue on Oxide Electronics for Beyond CMOS Logic
and Memory**
Call for Papers

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Aims and Scope

Oxide electronics has been a prominent field in computing for at least two decades. It achieved commercialization of oxide-based resistive memories and transistors with oxide conduction channels. Fascinating phenomena in oxides and their heterostructures were explored and remain an active area of research, such as two-dimensional electron gas, multiferroics, spin-orbit coupling, topological states, spin and orbital waves, etc.

We would like to invite papers with a critical analysis of the state of the field. The authors are encouraged to answer questions such as: What worked? What did not work? What key problems need to be resolved? What sub-fields are promising breakthroughs? What novel circuits and functionalities does oxide electronics enable?

Among particular interest are oxides involved in: multiferroic phenomena, antiferromagnetic switching, metal-insulator transitions, multiple states of computing variables, electron correlations, flexible or transparent electronics, self-assembly of oxides, etc.

Let us state the limitations on scope:

- 1) Papers focusing mainly on ferroelectric oxides (including traditional ferroelectric memories) will be a subject of another call.
- 2) Papers dealing with generic CMOS transistors albeit based on oxides is outside the scope by definition.
- 3) Beyond CMOS devices in which oxides serve as tunneling barriers or otherwise insulators are a topic of another call.
- 4) Papers primarily not involved in electric conduction or switching of other computing variables are of lower interest.
- 5) Papers on traditional oxide resistive memories are outside the scope of this call.
- 6) Cryogenic devices are a subject of another call.

This special topic of the IEEE JXCDC will present original recent research involving oxide electronics and span at least two levels of computing hierarchies like: materials – devices – circuits – computing architectures; or design – fabrication – measurement – simulation.

Topics of Interest include but are not limited to:

1. Beyond CMOS devices based on electron conduction in oxides.
2. Devices based on multiferroic (magnetic, electric dipole, strain, or orbital) states in oxides or coupling of such states.
3. Progress in high mobility and high carrier density in oxide semiconductors.
4. Devices (including memories) based on ion or vacancy drift in oxides going beyond traditional resistive memory mechanisms.
5. Devices based on orbital collective states in oxides.
6. Oxide based oscillators (including ferroelectric oscillators).
7. Progress in methods of fabrication (including deposition and patterning) of oxide structures or achievement of improved properties of oxides.
8. Tera-hertz wave generation.
9. Novel oxide devices for compute-in-memory, neural networks, or neuromorphic computing.
10. Circuits utilizing the above novel device in non-trivial ways.

Review papers on the topic are welcome. Demonstrations of novel devices or circuits are encouraged.

Important Dates

Open for Submission: Feb. 1st, 2022

Submission Deadline: March 15th, 2022

First Notification: April 15th, 2022

Revision Submission: May 1st, 2022

Final Decision: May 15th, 2022

Publication Online: June 1st, 2022

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](#).

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

JxCDC is sponsored by:

- Solid-State Circuits Society
- Circuits & Systems Society
- Council on Elect. Design Automation
- Council on Superconductivity
- Magnetics Society
- Electron Devices Society

PAPER FORMAT DESCRIPTION:

Papers can have 2 parts – the first part is a 4-8 page main paper (following a strict format – template available from website), and the second part is the supplementary material. The main paper itself will just focus on describing why the work is important, the state of the prior art, the key new accomplishment(s) or results, and then what the research directions are going forward. The main paper can have an

accompanying supplementary material (detailed methods) part. The supplementary material is not mandatory, but authors are strongly encouraged to submit supplementary material, which will increase the chance of acceptance. The Supplementary material (detailed methods) will be peer reviewed along with the main paper.

Style guidelines for the main paper:

The main report (min. of 4, max. of 8) is written in format of a letter. Due to their letter nature, the research must be original and must be of interest to research scientists/engineers and industry in related fields.

Abstract guidelines:

The report begins with a fully referenced paragraph, ideally 200 words aimed at readers in the general area of engineering and physical sciences. The references must be up-to-date (e.g. referring to the best available materials, devices, circuits) & convey the relevance and originality of the research. This paragraph starts with a 3-4 sentence basic introduction to the problem area explaining the relevance and the issues. This is followed by a one-sentence statement of the main conclusions (e.g. 'Here we show' or equivalent phrase); and finally, 2-3 sentences putting the main findings into general context so it is clear how the results described in the paper have moved the field forwards.

Body:

The text of the article must be succinct and start with general audience and progressively increase the complexity for experts. The body of the main paper must provide clear context to the present work based on established industry roadmaps, figures of merit or generally accredited framework (computational throughputs, leakage power, long form Reviews of Modern physics, IEEE proceedings, Nobel lectures). To enable the comparison it is encouraged that key quantitative findings of the paper are compared in a table with current references. Any concluding statements at the end of the article must be short since key conclusion is clearly articulated at the introduction. A repetition of the conclusions in the abstract should be avoided. Concluding statements explaining future possibilities or evolution are encouraged.

Style guidelines for supplementary material (methods paper):

The supplementary material is a unique format to encourage complete and clear communication of the relevant information to the experts in the area, while providing a citable source for the students for the innovations in scientific method: processing, modeling and theory. Long form derivations and code submissions are encouraged for theoretical and modeling papers. Modeling papers could for example provide all relevant data (not necessarily the code but they could) required to reproduce or validate the results. The JxCDC encourages the authors to put the experimental details such as fabrication methods, detailed characterizations, models or simulation methods (if it is a theory paper). The supplementary information therefore documents innovations in the experimental and modeling scientific methods, e.g. an innovative process technique to avoid interface effects, newly adopted differential equation solvers or innovative developments in device/circuit analysis can be included (and students/researchers will have a citable source online). Background materials that help the reader can be referenced in the supplemental material. The supplementary material part begins with an unreferenced abstract (typically 150 words) and is divided into separate sections for introduction, results, discussion and methods. Introduction and discussion are brief and focused. The results section usually contains a general description followed by their validation. The methods section provides technical details necessary for the independent validation of the methodology, without referring to a chain of bibliographical references. The text of the supplementary material (excluding abstract, methods, references and figure

legends) is limited to 6000 – 7000 words. Articles have no more than 12 display items (figures and tables). The results and methods should be divided by topical subheadings; the discussion may contain subheadings at the author's discretion. If statistical testing was used to analyze the data, the methods section can contain a subsection on statistical analysis. If significant EDA tools are employed, relevant validation can be provided for the novel approach. The experimental tools and the instrumentation used must be explained in a clear schematic preferably with the models (part numbers) mentioned.

In summary, all the new contributions and accomplishments are to be summarized in the 4 to 8 page main paper. The main paper format will be such that it can be understood by not only the expert but also the non-expert (providing the context to someone unfamiliar but wanting to follow progress in the field). All experimental or simulation methods to enable reproducing/validating the results of the paper are in the supplementary material (detailed methods) part.

IEEE Solid-State Circuits Society [Website](#)



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