Publication guidelines for papers involving computational lithography

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The following is another in a series of guidelines that is being furnished to authors and reviewers regarding the technical content in papers submitted to JM³. These guidelines serve multiple purposes. One is to provide a "checklist" of technical content that should be included in papers so that readers can have a good understanding of the paper. Also, it is understood that it is not always feasible for authors to divulge all information regarding their work, as some may be critical and confidential to their organization. These guidelines are intended to provide a common understanding for authors and reviewers regarding the minimum amount of information that should be included in papers published in a technical journal such as JM³. The guidelines below are for papers that involve computational lithography.

Computational lithography, usually simulation of a lithographic process, is a part of much of the research published in JM³. If computational lithography results are included in the publication, then some details about the software should also be included. However, if the computational lithography technology itself is the contribution of the publication, then significantly more detail is required. This document gives guidelines for these two cases.

1 Computational Lithography as a Tool

If computational lithography is only used as a tool to support some other research, then the following information is required.

- Name of the third-party software package used (if applicable) and a reference that explains it in more detail (if available)
- Name of the algorithm(s) used which are important to the research conclusions

  ○ Examples

    ■ Rigorous coupled wave analysis (RCWA)
    ■ Finite difference time domain (FDTD)

- Any atypical settings or adjustments made for this application

  ○ Examples

    ■ The number of cycles used in the FDTD simulation needed to be increased to accurately simulate the resonant EUV mask structure.
    ■ A constant image threshold was used to model resist because resist physics are not relevant to this work.

2 Computational Lithography as the Contribution of the Publication

If a new computational lithography technology is the reason for the publication, then the following information is required.

- Enough details of the new methods, along with relevant references, to clearly show what new technology is being introduced and why it is unique

- ○ We encourage all relevant details to be shared so a reader could recreate the work.
- ○ However, it is understood that publications related to commercial software need to hide some details. For these cases, as many details as possible should still be included, and the authors should explain, in a note to the editors and reviewers, what details cannot be shared for proprietary reasons.

    - For example, if a new neural network application is presented, the authors could describe the inputs, outputs, general structure, and third-party tools used but withhold the exact design of the network.

- ○ It is the responsibility of the reviewers and editors to determine if enough information is included to make a submission worthy of publication.

- Examples of the new methods used for industry relevant applications

  - ○ For example, if a new inverse lithography method is being published, the wafer targets should be relevant for current or future technology nodes, and the resulting mask patterns should be manufacturable for those nodes.

- Summary of runtime and memory use

  - ○ If raw numbers are reported (e.g. minutes, bytes) then details of the hardware used are required.
  - ○ If performance is reported compared to an existing method or third-party tool, then a summary of that tool, as described in the previous section, is required.
  - ○ If applicable, the scaling performance as the problem grows larger should also be included.

Acknowledgments