

Preparation of Papers for IEEE TRANSACTIONS ON MAGNETICS (Revised May 2009)

First A. Author^{1,2}, Second B. Author, Jr.², and Third C. D. Author^{3,4}, *Fellow, IEEE*

¹National Institute of Standards and Technology, Boulder, CO 80305 USA

²Physics Department, University of Colorado, Boulder, CO 80309 USA

³Metallurgical and Materials Engineering Department, Colorado School of Mines, Golden, CO 80401 USA

⁴National Institute for Materials Science, Tsukuba, Ibaraki 305, Japan

These instructions give you guidelines for preparing papers for IEEE TRANSACTIONS ON MAGNETICS. Use this document as a template if you are using Microsoft *Word* 6.0 or later. Otherwise, use this document as an instruction set. This template is useful for estimating the length of conference-related papers, but its use is optional. The electronic file of your paper will be formatted further at IEEE. Paper titles should be written in uppercase and lowercase letters. Avoid writing long formulas with subscripts in the title; short formulas that identify the elements are fine (e.g., “Nd-Fe-B”). Do not begin a title with the word “On.” Avoid starting a title with articles like “The.” Do not write “(Invited)” in the title. Full names of authors are preferred, but initials may be used instead. Put a space between authors’ initials. Department names are optional in the affiliations. Do not give street addresses in the affiliations (except for authors with no institutional affiliation). Define all symbols used in the abstract, and once again in the text. Do not cite references in the abstract.

Index Terms—About four key words or phrases in alphabetical order, separated by commas. For a list of suggested keywords, go to http://www.ieee.org/organizations/pubs/ani_prod/keywrd98.txt or send a blank e-mail to keywords@ieee.org.

[1] INTRODUCTION

THIS DOCUMENT is a template for Microsoft *Word* versions 6.0 or later. Use of this document as a template is optional. If you are reading a paper version of this document, please download the electronic file, TRANSMAG.DOC, from <http://www.ieee.org/web/publications/authors/transjnl/> so you can use it to prepare your manuscript. If you would prefer to use LaTeX, download IEEE’s LaTeX style and sample files, IEEEtran.zip, from the same Web page. Use these LaTeX files for formatting, but please follow the instructions in TRANSMAG.DOC or TRANSMAG.PDF.

When you open TRANSMAG.DOC, select “Print Layout” from the “View” menu in the menu bar (View > Print Layout). Then type over sections of TRANSMAG.DOC or cut and paste from another document and then use markup styles. The pull-down style menu is at the left of the Formatting Toolbar at the top of your *Word* window (for example, the style at this point in the document is “Text”). Highlight a section that you want to designate with a certain style; then select the appropriate name on the style menu. The style will adjust your fonts and line spacing. Use italics for emphasis; do not underline.

To insert images in *Word*, position the cursor at the insertion point and either use Insert > Picture > From File or copy the image to the Windows clipboard and then Edit > Paste Special > Picture (with “Float over text” unchecked). IEEE will do the final formatting of your paper, so do not worry about precisely positioning text, sections, figures, and tables.

If you have a question about formatting your paper, or a suggestion on improving these instructions, please contact r.goldfarb@ieee.org. If you modify this document for use with other IEEE journals or conferences, you should save it as type “Word 97-2002 [or 97-2003] & 6.0/95 - RTF (*.doc)” so that it can be opened by any version of *Word*.

Authors may prepare their papers for review using any word processor, one or two columns, single or double spaced. Please follow the writing style specified in this document. Most authors will find it convenient to use Microsoft *Word* and this template or LaTeX and the files contained in IEEEtran.zip.

[2] PROCEDURE FOR PAPER SUBMISSION

Regular and Conference-related Papers

A.1) Review Stage

Authors of regular and conference-related papers should prepare their papers for review using Microsoft *Word* and this template or LaTeX and the files contained in IEEEtran.zip. If your paper is submitted in conjunction with a conference, please observe any page limits specified by the conference. **Do not change the font sizes or line spacing to squeeze more text into a limited number of pages.** Note: unless the conference chair has decided otherwise, conference-related papers follow the same review procedures as regular papers.

Regular and conference-related papers must be submitted electronically to IEEE's on-line manuscript submission and peer-review system, *Manuscript Central*. Regular papers should be submitted at <http://mc.manuscriptcentral.com/transmag-ieee>; for conference-related papers, go to <http://mc.manuscriptcentral.com/magconf-ieee>. You should first check if you have an existing account. If there is none, please create a new account. (Your log-in information is the same on both sites.) After logging in, go to your Author Center and click on the link, "Click here to submit a new manuscript."

Along with other information, you will be asked to select the type of submission from a pull-down list. If you are submitting a conference-related paper, choose the type appropriate for your conference. Additionally, conference authors are asked for the conference paper number. Using the format specific to your conference, enter this number in the text box and also in the header at the top of this document.

There are 7 stages (screens) to the submission process; you must complete all 7 for a complete submission. At the end of each stage you must click "Save and Continue"; simply uploading files is not sufficient. After step 7 you should see a confirmation that the submission is complete. You should also receive an e-mail confirmation. For inquiries regarding the submission of your paper on *Manuscript Central*, please contact oprs-support@ieee.org or call +1 732 465 5861.

Manuscript Central will accept files for review in the following formats: DOC, RTF, PS, or PDF. PDF is preferred at the review stage. If you used LaTeX to prepare your document, you must generate a PDF or PS file to upload to *Manuscript Central*. Whatever format you upload, your figures should be embedded in the file, usually at the end.

You will be asked to file an electronic copyright form after your paper is accepted for publication. (Authors are responsible for obtaining any security clearances.)

A.2) Final Submission

After your paper is accepted, you will be asked to upload final files to *Manuscript Central*. These will include your DOC, RTF, or LaTeX document *source* file with embedded figures; an *additional* PS or PDF file if your source is LaTeX; and *separate*, individual figure files. These individual files may be in any of the following formats: TIF (preferred), PDF (preferred), JPG, GIF, EPS, DOC (MS *Word*, especially good for tables), or PPT (MS *PowerPoint*, commonly used to make figures). If you own Adobe *Acrobat*, please convert your DOC tables and PPT figures to PDF (or click on "Create Adobe PDF Online" at <http://www.adobe.com>). Figure and table files should be named following this convention: FIG1.TIF, FIG2.PPT, FIG3.PDF, etc. See more about figure preparation in Section III below.

Also upload a file with complete contact information for all authors. Include full mailing addresses, telephone numbers, fax numbers, and e-mail addresses. Designate the author who submitted the manuscript on *Manuscript Central* as the "corresponding author." This is the only author to whom proofs of the paper will be sent.

A.3) Publication

When your final submission is completed, your paper will be sent to IEEE for typesetting. PDF page proofs will be sent by e-mail to the corresponding author in 6 to 8 weeks, and your paper should appear in print 1 to 2 months after you return your proofs. Examples: If you return your PDF proofs on 1 May, your paper should appear in the June issue; if you return proofs on 15 May, it should appear in the July issue. (Exceptions: Three issues per year are reserved for conference-related papers; regular papers will not appear in those issues.) About 2 weeks after your proof corrections are entered, your paper will appear in pre-print form on the IEEE Xplore Web site, <http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?puNumber=20>, under "Accepted for Future Publication" (does not apply to conference-related papers).

Conference-related papers will all be published in a single issue of IEEE TRANSACTIONS ON MAGNETICS devoted to the conference. If you return page proofs late, your paper will appear in a later issue, identified as a conference-related paper.

[3] ADVANCED INFORMATION ON CREATION OF ELECTRONIC IMAGE FILES

Most authors will be able to prepare images in one of the allowed formats listed above. This section provides additional information on preparing PS, EPS, and TIFF files. No matter how you convert your images, it is a good idea to print the files to make sure nothing was lost in the process.

A. IEEE Graphics Checker

Graphics Checker is part of the IEEE's "Author Digital Toolbox," a collection of tools for authors available at <http://www.ieee.org/web/publications/authors/transjnl/>. The direct link for *Graphics Checker* is <http://graphicsqc.ieee.org/>. You can upload image files in batches of up to 10 to be analyzed and compared to IEEE's requirements for metadata, file size, file type, file naming, resolution parameters, and color format. You will receive a detailed report on the usability of each image analyzed. The report will include an explanation of any error found, along with, when possible, application-specific tips on how to fix the image. (You may ignore warnings that the author's name is not part of the file name.) For more information, contact the IEEE Graphics Help Desk by e-mail at graphics@ieee.org. You will receive an e-mail response and sometimes a request for a sample graphic for IEEE to check.

B. Scanning Images to PS and EPS

If you have a scanner, a quick way to prepare figure files is to print your figures on paper exactly as you want them to appear, scan them, and then save them to a file in PostScript (PS) or Encapsulated PostScript (EPS) formats. Use a separate file for each image. File names should be of the form FIG1.PS or FIG2.EPS.

C. Scanning Images to TIFF

Using a scanner as above, you may save the images in TIFF format. The following specifications are the minimum requirements for TIFF images; you may use higher resolution. As a rule, if your image file size is much below 0.5 MB, your TIFF image probably does not have enough resolution.

High-contrast line figures and tables should be prepared with at least 600 dpi resolution and saved with no compression, 1 bit per pixel (monochrome), with file names of the form FIG3.TIF. To obtain a 3.45 inch figure (one column width) at 600 dpi, the figure requires a horizontal size of 2070 pixels.

Photographs and grayscale figures should be prepared with at least 220 dpi resolution and saved with no compression, 8 bits per pixel (grayscale). To obtain a 3.45 inch figure (one column width) at 220 dpi, the figure should have a horizontal size of 759 pixels.

Color figures should be prepared with at least 400 dpi resolution and saved with no compression, 8 bits per pixel (palette or 256 color). To obtain a 3.45 inch figure (one column width) at 400 dpi, the figure should have a horizontal size of 1380 pixels.

For more information on TIFF files, please see <http://www.ieee.org/web/publications/authors/transjnl/> and click on the link "Guidelines for Author Supplied Electronic Text and Graphics."

D. Printing images to PS Files

You may create PostScript figures by "printing" them to files. First, download a PostScript printer driver from <http://www.adobe.com/support/downloads/#Printer> (for Windows and Macintosh) and also install the "PPD Files: Adobe" printer definition. In *Word*, paste your figure into a new document. Print to a file using the PostScript printer driver. File names should be of the form FIG5.PS. Use "Open Type" fonts when creating your figures, if possible: Times Roman, Helvetica, Helvetica Narrow, Courier, Symbol, Palatino, Avant Garde, Bookman, Zapf Chancery, Zapf Dingbats, and New Century Schoolbook.

E. Converting PDF to TIFF

Experienced computer users can convert figures and tables from their original format to TIFF. Some useful image converters are Adobe *Photoshop*, Corel *Draw*, and Microsoft *Photo Editor*, an application that is part of Microsoft *Office* (look for C:\Program Files\Common Files\Microsoft Shared\PhotoEd\PHOTOED.EXE. (You may have to custom-install *Photo Editor* from your original *Office* disk.)

If you own Adobe *Acrobat*, you may convert many types of files to PDF. For example, you may print a *PowerPoint* PPT file to PDF. You may then convert a figure in the PDF file to TIFF with Adobe *Acrobat* or *Reader*: Use the Snapshot Tool to first select the figure. Then View > Zoom To a large magnification (e.g., 1600%). Then Edit > Copy to the Windows clipboard. Open Microsoft *Photo Editor*, Edit > Paste as New Image, crop, and adjust resolution as above.

Alternatively, you may open the PDF in *PhotoShop*. Set the resolution to open at 1200 dpi. Note that the obvious way to convert PPT to TIFF gives poor results: In *PowerPoint*, File > Save As > Save as type TIFF.

F. Saving Files in TIFF

Most graphing programs allow you to save graphs in TIFF; however, you often have no control over compression or number of bits per pixel. You should open these image files in a program such as Microsoft *Photo Editor* and re-save them using no compression, either 1 or 8 bits, and either 600 or 220 dpi resolution (File > Properties; Image > Resize). See Section III.C for an explanation of number of bits and resolution.

G. Using Print Screen

If your graphing program cannot export to TIFF, you can use the Print Screen function. Set your monitor to its highest resolution. Adjust the magnification so that you can view the entire image on the screen. (In *PowerPoint*, you may use Slide Show to get a full-screen image.) Move the cursor so it is out of the way. Press "Print Screen" on your keyboard; this copies the screen image to the Windows clipboard. Open Microsoft *Photo Editor* and click Edit > Paste as New Image. Crop the image (click Select button; select the part you want, then Image > Crop). Adjust the properties of the image (File > Properties) to get a width of 3.45 inches. Save the file (File > Save As) in TIFF with no compression (click "More" button).

H. Converting WMF to TIFF

A way to convert a figure from Windows Metafile (WMF) to TIFF is to paste it into Microsoft *PowerPoint*, save it in JPG format, open it with Microsoft *Photo Editor* or similar converter, and re-save it as TIFF.

[4] UNITS

Use either SI (MKS) or CGS as primary units. (SI units are strongly encouraged.) English units may be used as secondary units (in parentheses). This applies to papers in data storage. For example, write “15 Gbit/cm² (100 Gbit/in²).” An exception is when English units are used as identifiers in trade, such as “3½ in disk drive.” Avoid combining SI and CGS units, such as current in amperes and magnetic field in oersteds. This often leads to confusion because equations do not balance dimensionally. If you must use mixed units, clearly state the units for each quantity in an equation.

The SI unit for magnetic field strength H is A/m. However, if you wish to use units of T, either refer to magnetic flux density B or magnetic field strength symbolized as $\mu_0 H$. Use the center dot to separate compound units, e.g., “A·m².”

[5] HELPFUL HINTS

A. *Editing Service*

IEEE has partnered with SPi Publisher Services, to offer pre-submission professional editing services to IEEE authors. SPi copyeditors and typesets more than 1 million pages per year for over 600 journals. Authors who would like assistance with English grammar and usage prior to submitting their manuscripts for review or during the review process can go to <http://www.prof-editing.com/ieee/> to submit a manuscript for copyediting. A link is provided on the Manuscript Central Web site. SPi copyeditors will edit for grammar, usage, organization, and clarity. Authors can use the service, at their own expense, as often as desired. Cost estimates are available on-line, typically about \$100 for a four-page article. Edited manuscripts are generally returned to the authors within two weeks of submission.

B. *Figures and Tables*

Because IEEE will do the final formatting of your paper, you do not need to position figures and tables at the tops and bottoms of columns. In fact, all figures, figure captions, and tables can be at the end of the paper. Please mark in the text where the figures and tables are supposed to appear. Large figures and tables may span both columns. Place figure captions below the figures; place table titles above the tables. If your figure has two parts, for example, include the labels “(a)” and “(b)” as part of the artwork. Please verify that figures and tables that you mention in the text actually exist. **Please do not include captions as part of the figures. Do not put captions in “text boxes” linked to the figures. Do not put borders around the outside of your figures.** Use the abbreviation “Fig.” even at the beginning of a sentence. Do not abbreviate “Table.” Tables are numbered with Roman numerals.

TABLE 1 HERE

C. *Color Figures*

There is no charge for color figures for the *electronic* (IEEE Xplore) version of a paper. However, if any figures must be in color for the *print* version of the paper, the cost is about \$1300, depending on the number of figures and their placement. You will be billed directly by IEEE. When you send the final version of their paper, you should indicate very clearly if you want color in the *print* version. In the absence of such instructions, color will be used only for the *electronic* version. In that case, please be certain that the black-and-white *print* version is understandable without the color information. If you want reprints of your color article, the reprint order should be submitted promptly. There is an additional charge of \$81 per 100 for color reprints.

Figure axis labels are often a source of confusion. Use words rather than symbols. As an example, write the quantity “Magnetization,” or “Magnetization, M ,” not just “ M .” However, if there is not enough room on the axis to specify the quantity, write just the symbol “ M ,” but define it in the figure caption.

IEEE allows two ways to designate units in graphs and tables: (1) Put units in parentheses. As in Fig. 1, for example, write “Magnetization (A/m)” or “Magnetization, M (A·m⁻¹)” (but not just “A/m”). (2) Label axes with a ratio of symbols and units. For example, write “Magnetization, $M/(A·m^{-1})$ ” or “Temperature, T/K ” (but not “Temperature/K”).

Multipliers can be especially confusing. Write “Magnetization (kA/m)” or “Magnetization (10³ A/m).” Do not write “Magnetization (A/m) × 1000” because the reader would not know whether the top axis label in Fig. 1 meant 16000 A/m or 0.016 A/m. Figure labels should be legible, approximately 8 to 12 point type when reduced to journal column width.

FIG. 1 HERE

D. *References*

Number citations consecutively in square brackets [1]. The sentence punctuation follows the brackets [2]. Multiple references [2], [3] are each numbered with separate brackets [1]-[3]. When citing a section in a book, please give the relevant page numbers [2]. In sentences, refer simply to the reference number, as in [3]. Do not use “Ref. [3]” or

“reference [3]” except at the beginning of a sentence: “Reference [3] shows” Unfortunately the IEEE document translator cannot handle automatic endnotes in *Word*; therefore, type the reference list at the end of the paper using the “References” style.

Number footnotes separately in superscripts (Insert > Footnote).¹ Place the actual footnote at the bottom of the column in which it is cited; do not put footnotes in the reference list (endnotes). Use letters for table footnotes (see Table I).

Note that IEEE referencing style is quite different from that used by most physics journals. Give all authors’ names; do not use “*et al.*” unless there are six authors or more. Use a space after authors’ initials. Papers that have not been published should be cited as “unpublished” [4]. Papers that have been submitted for publication should be cited as “submitted for publication” [5]. (Since the paper may not be accepted, it is best to not specify the journal.) Papers that have been accepted for publication but not yet assigned to an issue should be cited as “to be published” [6]. Please give affiliations and addresses for private communications [7].

Capitalize only the first word in a paper title, except for proper nouns and element symbols. If you are preparing a conference-related paper and are short of space, you may omit paper titles. However, paper titles are helpful to your readers and are strongly recommended. For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [8].

Adequacy of references is one of many factors considered by *Transactions* reviewers. One indication of timeliness and suitability is whether citations include recent articles that have appeared in the *Transactions*.

E. Abbreviations and Acronyms

Define abbreviations and acronyms the first time they are used in the text, even after they have already been defined in the abstract. Abbreviations such as IEEE, SI, ac, and dc do not have to be defined. Abbreviations that incorporate periods should not have spaces: write “C.N.R.S.,” not “C. N. R. S.” Do not use abbreviations in the title unless they are unavoidable (for example, “IEEE” in the title of this article).

F. Equations

If you are using *Word*, use either the Microsoft Equation Editor or the *MathType* add-on (<http://www.mathtype.com>) for equations in your paper (Insert > Object > Create New > Microsoft Equation *or* MathType Equation). “Float over text” should *not* be selected.

Number equations consecutively with equation numbers in parentheses flush with the right margin, as in (1). First use the equation editor to create the equation. Then select the “Equation” markup style. Press the tab key and write the equation number in parentheses. To make your equations more compact, you may use the solidus (/), the exp function, or appropriate exponents. Use parentheses to avoid ambiguities in denominators. Punctuate equations when they are part of a sentence, as in

¹It is recommended that footnotes be avoided (except for the unnumbered footnote with the receipt date on the first page). Instead, try to integrate the footnote information into the text.