

# Preparation of Papers for BIOT2009 papers and abstracts (Feb 2009)

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**Abstract**—These instructions were prepared based on the guidelines provided by IEEE TRANSACTIONS and JOURNALS, modified for BIOT 2009 conference papers and abstracts. Use this document as a template if you are using L<sup>A</sup>T<sub>E</sub>X. Define all symbols used in the abstract. Do not cite references in the abstract. For 2-page abstracts, delete both of this Abstract and the next Index Terms paragraphs and start with the main text. Do not use this template if you are preparing 1-page poster abstracts. Instruction for 1-page poster abstracts is provided on the BIOT 2009 website.

**Index Terms**—About four key words or phrases in alphabetical order, separated by commas. Delete this paragraph if you are preparing abstracts.

## I. INTRODUCTION

This document is a template for L<sup>A</sup>T<sub>E</sub>X. If you are reading a PDF version of this document, please download the electronic file, BIOT2009paper.tex, from the BIOT 2009 website at <http://www.biotconf.org> so you can use it to prepare your manuscript. If you would prefer to use Microsoft Word, download BIOT 2009's sample file from the same web page. When using this template and the class file IEEEtran.cls, **do not change the font sizes or line spacing to squeeze more text into a limited number of pages.** Use italics for emphasis; do not underline.

To insert images, use one of the many graphics packages available for L<sup>A</sup>T<sub>E</sub>X, e.g. graphicx.

## II. HEADING LEVEL 1

### A. Heading Level 2

Full papers should be structured as follows:

- Abstract
- Index Terms
- Main text
  - INTRODUCTION
  - Any other sections
  - ACKNOWLEDGMENTS (if appropriate)
  - REFERENCES

2-page abstracts should be structured as follows:

- Do not include Abstract and Index Terms
- Main text
  - \* REFERENCES is the only necessary section

### B. Paper and abstract submissions

For both papers and 2-page abstracts, do not change the US-letter size 2-column format used in the template. When you are ready for submission, save your manuscript in Portable Document Format (PDF). Go to our submission system at <http://www.biotconf.org/papersubmission>. Provide the author names, their mailing and email addresses, abstract, and three keywords. These abstract and keywords are used for selecting reviewers expert in the relevant area. Thus it is essential that the abstract and keywords provide enough information about the submitted works. Finally, upload the PDF file. Only PDF files are accepted.

### C. Preparation of figures and tables

We recommend that you size charts, graphs and tables one column wide (3 1/2 inches or 21 picas) or two-column wide (7 1/16 inches or 43 picas wide). Color graphics will be printed in grayscale in the symposium proceedings.

## III. MATH

In L<sup>A</sup>T<sub>E</sub>X, the amsmath package is very useful in writing equations.

## IV. 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 Gb/cm<sup>2</sup> (100 Gb/in<sup>2</sup>).” 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 · m<sup>2</sup>.”

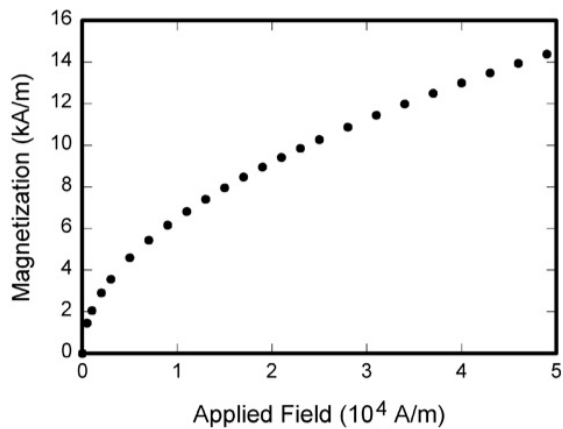


Fig. 1. Magnetization as a function of applied field. Note that “Fig.” is abbreviated. There is a period after the figure number, followed by two spaces. It is good practice to explain the significance of the figure in the caption.

## V. HELPFUL HINTS

### A. Figures and Tables

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, include the labels “(a)” and “(b)” as part of the artwork. Please verify that the figures and tables you mention in the text actually exist. **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.

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 “ $M$ .” Put units in parentheses. Do not label axes only with units. As in Fig. 1, for example, write “Magnetization (A/m)” or “Magnetization ( $A\ m^{-1}$ ),” not just “A/m.” Do not label axes with a ratio of quantities and units. For example, write “Temperature (K),” not “Temperature/K.”

Multipliers can be especially confusing. Write “Magnetization (kA/m)” or “Magnetization (103 A/m).” Do not write “Magnetization (A/m)  $\times 1000$ ” 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.

### B. 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 ...”

TABLE I  
UNITS FOR MAGNETIC PROPERTIES

| Symbol       | Quantity                                  | Conversion from Gaussian and CGS EMU to SI <sup>a</sup>   |
|--------------|---|---|
| $\Phi$       | magnetic flux                             | 1 Mx $\rightarrow 10^{-8}$ Wb = $10^{-8}$ V $\cdot$ s   |
| $B$          | magnetic flux density, magnetic induction | 1 G $\rightarrow 10^{-4}$ T = $10^{-4}$ Wb/m <sup>2</sup>                                       |
| $H$          | magnetic field strength                   | 1 Oe $\rightarrow 10^3/(4\pi)$ A/m  |
| $m$          | magnetic moment                           | 1 erg/G = 1 emu<br>$\rightarrow 10^{-3}$ A $\cdot$ m <sup>2</sup> = $10^{-3}$ J/T               |
| $M$          | magnetization                             | 1 erg/(G $\cdot$ cm <sup>3</sup> ) = 1 emu/cm <sup>3</sup><br>$\rightarrow 10^3$ A/m            |
| $4\pi M$     | magnetization                             | 1 G $\rightarrow 10^3/(4\pi)$ A/m   |
| $\sigma$     | specific magnetization                    | 1 erg/(G $\cdot$ g) = 1 emu/g<br>$\rightarrow 1$ A $\cdot$ m <sup>2</sup> /kg                   |
| $j$          | magnetic dipole moment                    | 1 erg/G = 1 emu<br>$\rightarrow 4\pi \times 10^{-10}$ Wb $\cdot$ m                              |
| $J$          | magnetic polarization                     | erg/(G $\cdot$ cm <sup>3</sup> ) = 1 emu/cm <sup>3</sup><br>$\rightarrow 4\pi \times 10^{-4}$ T |
| $\chi\kappa$ | susceptibility                            | 1 $\rightarrow 4\pi$  |
| $\chi\rho$   | mass susceptibility                       | 1 cm <sup>3</sup> /g $\rightarrow 4\pi \times 10^{-3}$ m <sup>3</sup> /kg                       |
| $\mu$        | permeability                              | 1 $\rightarrow 4\pi \times 10^{-7}$ H/m<br>= $4\pi \times 10^{-7}$ Wb/(Am)                      |
| $\mu_r$      | relative permeability                     | $\mu \rightarrow \mu_r$   |
| $w, W$       | energy density                            | 1 erg/cm <sup>3</sup> $\rightarrow 10^{-1}$ J/m <sup>3</sup>                                    |
| $N, D$       | demagnetizing factor                      | 1 $\rightarrow 1/(4\pi)$  |

Vertical lines are optional in tables. Statements that serve as captions for the entire table do not need footnote letters.

<sup>a</sup>Gaussian units are the same as cgs emu for magnetostatics; Mx = maxwell, G = gauss, Oe = oersted; Wb = weber, V = volt, s = second, T = tesla, m = meter, A = ampere, J = joule, kg = kilogram, H = henry.

Number footnotes separately in superscripts<sup>1</sup>. 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, using the minipage environment (see Table I).

Please note that the references at the end of this document are in the preferred referencing style. 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 accepted for publication, but not yet specified for an issue should be cited as “to be published” [5]. Papers that have been submitted for publication should be cited as “submitted for publication” [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. For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [8].

### C. 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

<sup>1</sup>It is recommended that footnotes be avoided. Instead, try to integrate the footnote information into the text.

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.

#### D. Equations

Number equations consecutively with equation numbers in parentheses flush with the right margin, as in (1). 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

$$\int_0^{r_2} F(r, \varphi) dr d\varphi = [\sigma r_2 / (2\mu_0)] \cdot \int_0^\infty \exp(-\lambda|z_j - z_i|) \lambda^{-1} J_1(\lambda r_2) J_0(\lambda r_i) d\lambda \quad (1)$$

Be sure that the symbols in your equation have been defined before the equation appears or immediately following. Italicize symbols ( $T$  might refer to temperature, but  $T$  is the unit tesla). Refer to “(1),” not “Eq. (1)” or “equation (1),” except at the beginning of a sentence: “Equation (1) is ... .”

#### E. Other Recommendations

Hyphenate complex modifiers: “zero-field-cooled magnetization.” Avoid dangling participles, such as, “Using (1), the potential was calculated.” (It is not clear who or what used (1).) Write instead, “The potential was calculated by using (1),” or “Using (1), we calculated the potential.”

Use a zero before decimal points: “0.25,” not “.25.” Use “cm<sup>3</sup>,” not “cc.” Indicate sample dimensions as “0.1 cm × 0.2 cm,” not “0.1 × 0.2 cm<sup>2</sup>.” The abbreviation for “seconds” is “s,” not “sec.” Do not mix complete spellings and abbreviations of units: use “Wb/m<sup>2</sup>” or “webers per square meter,” not “webers/m<sup>2</sup>.” When expressing a range of values, write “7 to 9” or “7–9” (two dashes in L<sup>A</sup>T<sub>E</sub>X).

A parenthetical statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.) In American English, periods and commas are within quotation marks, like “this period.” Other punctuation is “outside!” Avoid contractions; for example, write “do not” instead of “don’t.” The serial comma is preferred: “A, B, and C” instead of “A, B and C.”

If you wish, you may write in the first person singular or plural and use the active voice (“I observed that ...” or “We observed that ...” instead of “It was observed that ...”). Remember to check spelling. If your native language is not English, please get a native English-speaking colleague to carefully proofread your paper.

#### VI. SOME COMMON MISTAKES

The word “data” is plural, not singular. The subscript for the permeability of vacuum  $\mu_0$  is zero, not a lowercase letter “o.” The term for residual magnetization is “remanence”; the adjective is “remanent”; do not write “remnance” or “remnant.” Use the word “micrometer” instead of “micron.” A graph within a graph is an “inset,” not an “insert.” The

word “alternatively” is preferred to the word “alternately” (unless you really mean something that alternates). Use the word “whereas” instead of “while” (unless you are referring to simultaneous events). Do not use the word “essentially” to mean “approximately” or “effectively.” Do not use the word “issue” as a euphemism for “problem.” When compositions are not specified, separate chemical symbols by en-dashes; for example, “NiMn” indicates the intermetallic compound Ni<sub>0.5</sub>Mn<sub>0.5</sub> whereas “Ni–Mn” indicates an alloy of some composition Ni <sub>$x$</sub> Mn<sub>1– $x$</sub> .

Be aware of the different meanings of the homophones “affect” (usually a verb) and “effect” (usually a noun), “complement” and “compliment,” “discreet” and “discrete,” “principal” (e.g., “principal investigator”) and “principle” (e.g., “principle of measurement”). Do not confuse “imply” and “infer.”

Prefixes such as “non,” “sub,” “micro,” “multi,” and “ultra” are not independent words; they should be joined to the words they modify, usually without a hyphen. There is no period after the “et” in the Latin abbreviation “*et al.*” (it is also italicized). The abbreviation “i.e.,” means “that is,” and the abbreviation “e.g.,” means “for example” (these abbreviations are not italicized).

An excellent style manual and source of information for science writers is [9]. A general IEEE style guide and an Information for Authors are both available at <http://www.ieee.org/web/publications/authors/transjnl/index.html>

#### VII. CONCLUSION

A conclusion section is not required. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

#### APPENDIX

Appendices, if needed, appear before the acknowledgment. This is an unnumbered section.

#### ACKNOWLEDGMENT

The preferred spelling of the word “acknowledgment” in American English is without an “e” after the “g.” Use the singular heading even if you have many acknowledgments. Avoid expressions such as “One of us (S.B.A.) would like to thank ... .” Instead, write “F. A. Author thanks ... .” Sponsor and financial support acknowledgments are placed here. This is an unnumbered section.

#### REFERENCES

- [1] G. O. Young, “Synthetic structure of industrial plastics (Book style with paper title and editor),” in *Plastics*, 2nd ed. vol. 3, J. Peters, Ed. New York: McGraw-Hill, 1964, pp. 15–64.
- [2] W.-K. Chen, *Linear Networks and Systems* (Book style). Belmont, CA: Wadsworth, 1993, pp. 123–135.
- [3] H. Poor, *An Introduction to Signal Detection and Estimation*. New York: Springer-Verlag, 1985, ch. 4.
- [4] B. Smith, “An approach to graphs of linear forms (Unpublished work style),” unpublished.
- [5] E. H. Miller, “A note on reflector arrays (Periodical style—Accepted for publication),” *IEEE Trans. Antennas Propagat.*, to be published.

- [6] J. Wang, "Fundamentals of erbium-doped fiber amplifiers arrays (Periodical style—Submitted for publication)," IEEE J. Quantum Electron., submitted for publication.
- [7] C. J. Kaufman, Rocky Mountain Research Lab., Boulder, CO, private communication, May 1995.
- [8] (Basic Book/Monograph Online Sources) J. K. Author. (year, month, day). Title (edition) [Type of medium]. Volume (issue). Available: [http://www.\(URL\)](http://www.(URL))
- [9] J. Jones. (1991, May 10). Networks (2nd ed.) [Online]. Available: <http://www.atm.com>
- [10] (Journal Online Sources style) K. Author. (year, month). Title. Journal [Type of medium]. Volume(issue), paging if given. Available: [http://www.\(URL\)](http://www.(URL))