

¹Title of Manuscript (DESCRIPTIVE WITH MINIMAL ACRONYMS)

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Note:

Author List – First author is primary author, following in amount of work done on journal, Last author is author who is supporting most of the work whether in funding, ideas and/or lab support; typically the last author is the *corresponding author*.

Affiliations – Department, Organization, City, State, Country

ABSTRACT

Abstract-(*past tense*) condensed version of topic, problem, approach to solving problem, how you solved problem (findings & conclusions), and implications

- *Topic* – 1 sentence
- *Question* (hypothesis or problem to be solved) – 1 sentence
- *Approach* – 1 sentence
- *Findings* – 1 to 2 sentences
- *Conclusions* – 1 sentence
- *Implications* (sometimes) – 1 sentence

(1/4-1/2 page; max. ½ page) Summarize your findings. The audience for your summary is depends on the journal, but most likely it is your research peers. Note: use third person for the entire manuscript. Do not use pronouns such as I, you, etc.. Minimize use of pronouns such as we and one.

INTRODUCTION

(present tense) Introduce the research area using the funnel approach starting broad and funneling down.

- Big picture: 1 to 2 sentences
- Your area: 2-3 sentences
- Your topic: 1-3 paragraphs
 - Cover published work by others in the field
 - Cover your previous work in the field
- State the gap in knowledge that you intend to fill: 1-2 paragraphs
 - State 2-3 aspects of what is missing in the literature.
 - State the questions that are unresolved by this knowledge gap.
- State how Your Study addresses these questions; that is, how Your Study fills the Knowledge Gap.
- List possible implications of your study.

EXPERIMENTAL (MATERIALS & METHODS)

(*past tense*) describe experiments, approach, methodology Describe the instrumentation, devices and the methods used to perform for each measurement. Include:

- Devices
- Processing
- Characterization, Measurements
- Instrumentation used
- How the data will be analyzed, how the data will be tied together. Describe the data analysis approach. Include software used, statistics & error analysis used, fitting method (e.g., linear regression & how it is done) etc.

Rule: "Enough information must be given so that the experiment could be reproduced by a competent colleague"[1]

RESULTS

(*past tense*) Thoroughly describe your results. Provide a statement of data, data analysis, and what is observed in the data. Include data (e.g., figures, tables, schematics, photographs, etc.), data regression, diagram & sketches, etc. You may include your figures and tables here. Figures should have captions and figure numbers.

- Provide a broad description of the experiments, providing the "big picture" without repeating the experimental details
- Should sequentially follow the Experimental section
- Select most pertinent data applicable to the study
- Describe figures and tables selectively. Do not regurgitate.
- Describe your observations of the results such as tendencies and trends each figure and table
- Compare the tendencies and trends between figures and tables

¹ The formatting and some comments are taken in part from IEEE Transactions and are to be used for educational purposes only.

DISCUSSION

Decide before writing, what are the 3 most important aspects of the work that readers should know tomorrow. Then write about each one separately. Discuss the results relative to work of others and the meaning of the results, what are your findings. State or theorize the reasons behind the results (i.e., discussion) using your knowledge of the field.

- Answer the questions posed in the introduction. Think of the Discussion and Introduction as a complimentary pair.
- Discuss, compare & contrast aspects of figures and tables with one another and what it might mean
- Discuss your data relative to its meaning.
- Discuss what might be the meaning of the observed tendencies and trends described in the results. Do so relative to:
 - Your own previous work
 - Other published data
 - Tie it back to the introduction and previous work in the field you introduced
- Highlight areas in your study that are questionable – be critical of your own work – do not hide any gaps in your study. If you do not do this, the reviewers will find them.
- Ramifications, implications – state why the findings are significant
- In general, point out the behavior of the data (e.g., figures, tables, etc.) and then suggest what the behavior might signify/mean/indicate. Then support this stance with references if you can. Ways to do this include:
 - Use a model to describe/simulate the data. The model may be based on physics or phenomenological/empirical. Use work of others to substantiate your model (e.g., someone else has observed the same trends or used a similar model).
 - Use statistics to describe your data. Use the statistics show or demonstrate a certain behavior or disprove a certain behavior.
-

CONCLUSION OR SUMMARY AND FUTURE WORK

Similar to abstract, but emphasize answering the questions listed in the Introduction that highlighted the knowledge gap you indentified. Do not leave any questions in the Introduction unanswered.

ACKNOWLEDGMENTS

Acknowledge anyone that helped you and any funding resources used to support the project. It is fine to be liberal when acknowledging – its free.

REFERENCES

List Journal and Conference papers, books, and course notes. Refrain from citing websites unless it is for software purposes. If you really feel that you want to use a website as a reference, please talk to me about it. Use more than two

references. References should be cited within the body of your report.

Reference Formatting Examples:

- [1] Larry J. Forney, Dept. of Biological Sciences, Professor Trish Hartzell, PhD. Department of Microbiology, Molecular Biology, and Biochemistry, University of Idaho, Moscow, ID; “Eschew Obfuscation: Advice on Writing Clearly”, presented at the 2008 INBRE Conference, Boise, ID.
- [2] Author list, *Title of journal paper*, Volume (Year) page numbers.
- [3] Author list, *Title of conference paper*, Conference Name (Year) page numbers.
- [4] Author list, *Title of Book*, Edition (Publisher, Year) pages used.

Please use fonts between 10 – 12 (Title can be 14). Please use 1 inch margins and page numbers.

Comments on Tenses:

- Present tense:
 - For the general case and statements on what is currently known.
 - E.g., statements that are: general knowledge, widely accepted, and those that can be referenced in the present tense.
- Past tense:
 - Experimental results
 - Observations that were made during your study

Formatting of Equations:

Equations should be on a separate line and numbered and all variables are defined. For instance, the energy of a photon is described by:

$$E = h\nu \tag{1}$$

where h is Planck's constant and ν is the frequency of the photon.

Formatting of Tables:

TABLE I UNITS FOR MAGNETIC PROPERTIES		
Symbol	Quantity	Conversion from Gaussian and CGS EMU to SI ^a
Φ	magnetic flux	1 Mx $\rightarrow 10^{-8}$ Wb = 10^{-8} V·s
B	magnetic flux density, magnetic induction	1 G $\rightarrow 10^{-4}$ T = 10^{-4} Wb/m ²
H	magnetic field strength	1 Oe $\rightarrow 10^3/(4\pi)$ A/m
m	magnetic moment	1 erg/G = 1 emu $\rightarrow 10^{-3}$ A·m ² = 10^{-3} J/T
M	magnetization	1 erg/(G·cm ³) = 1 emu/cm ³ $\rightarrow 10^3$ A/m
$4\pi M$	magnetization	1 G $\rightarrow 10^3/(4\pi)$ A/m
σ	specific magnetization	1 erg/(G·g) = 1 emu/g $\rightarrow 1$ A·m ² /kg
j	magnetic dipole moment	1 erg/G = 1 emu $\rightarrow 4\pi \times 10^{-10}$ Wb·m
J	magnetic polarization	1 erg/(G·cm ³) = 1 emu/cm ³ $\rightarrow 4\pi \times 10^{-4}$ T
χ, κ	susceptibility	1 $\rightarrow 4\pi$
χ_p	mass susceptibility	1 cm ³ /g $\rightarrow 4\pi \times 10^{-3}$ m ³ /kg
μ	permeability	1 $\rightarrow 4\pi \times 10^{-7}$ H/m = $4\pi \times 10^{-7}$ Wb/(A·m)

μ_r	relative permeability	$\mu \rightarrow \mu_r$
w, W	energy density	$1 \text{ erg/cm}^3 \rightarrow 10^{-1} \text{ J/m}^3$
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.

³Gaussian 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.

Formatting of Figures:

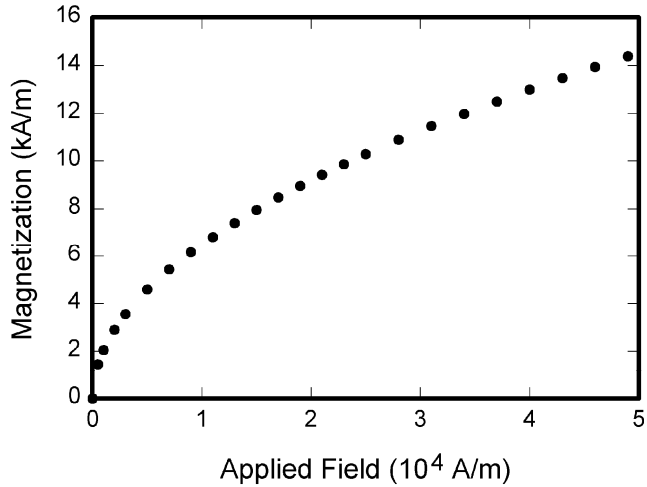


Fig. 1. Magnetization as a function of applied field. Note that “Fig.” is abbreviated. There is a period after the figure number, followed by two spaces. It is good practice to explain the significance of the figure in the caption.