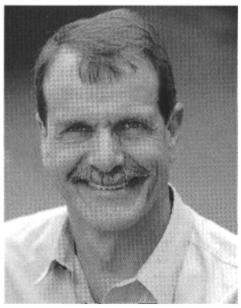

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Using the Right Terms

Keywords: IEEE standards; dielectric constant; permittivity; electric field; magnetic field

IEEE standards committees are responsible for the creation and maintenance of standards for the profession. Part of these responsibilities relate to standards documents, which define the terms that aim to ensure clarity of expression and mutual understanding around the world. The use of clearly defined terms is one of the hallmarks of a profession.

Standards committees make recommendations that are reviewed and finally approved by a comprehensive balloting process. The initial recommendations for these definitions are subjected to a review that reflects current usage and understanding, rather than putting into place terms that are untested by time and usage. These definitions thus lag and reflect on usage by the profession, rather than lead and direct. For these reasons, changes in definitions are generally slow, despite the fact that the IEEE Standards Association mandates a five-year review, when the relevant committee has the option of withdrawal of the complete document, renewing without change, or renewing with suggesting changes.

It is imperative that all members of the profession use these terms in preference to other "colloquial" expressions in all scientific writing, and reviewers of documents have some responsibility to ensure that the correct terms continue to be used.

Three terms no longer recognized in the *IEEE Standard Definitions of Terms for Radio Wave Propagation* [1] and their accepted replacements are as follows:

No Longer Accepted	Acceptable Equivalent Terms
dielectric constant	permittivity, electric permittivity, dielectric permittivity
electric field intensity **E**	electric field **E**
magnetic field intensity **H**	magnetic field **H**

A quick inspection of publications using Google Scholar shows that the term "dielectric constant" is still widely used, even in IEEE publications. The term was deprecated (removed from the list of definitions) because the permittivity is frequency dependent, and so is not a constant.

The "electric field intensity" and "magnetic field intensity" were deprecated some time ago (1990?) in favor of "electric field" and "magnetic field." The word "intensity" implied power, which is not the case for the electric and magnetic fields, where the power is related to the square of the field strength. A quick review using the Google search engine reveals a significant amount of content in recent use.

In addition, many of the standard electromagnetic textbooks, even in their most recently revised editions, have continued to use deprecated terms. This can be very confusing for the next generation of professionals.

So, I believe we all have a scientific responsibility:

- to write using acceptable terminology
- to review by insisting authors use acceptable terminology
- to edit by insisting authors use acceptable terminology
- to revise textbooks, lecture notes, and other instructional material to use only acceptable terminology

The Wave Propagation Standards Committee is currently reviewing P211 *Definition of Terms* [1]. If you would like to make some suggestions for new definitions, please get in touch.

Reference

[1] *IEEE Standard Definitions of Terms for Radio Wave Propagation*, IEEE Std 211-1997, New York, IEEE.

when they have sufficient funds to keep them happy, even when their income may drastically decline. As the economy continues to struggle, having enough money to be happy becomes more of a challenge.

I was watching television the other night, and the reporter John Stossel made a nice closing statement for this column (this is an approximate quote): "Money does not guarantee happiness, but poverty prevents you from achieving happiness."

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