

# A Note on the Use of the term “Metamaterial”

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Metamaterial is commonly regarded as a type of exotic super-material with permittivity and permeability values significantly different from those found in natural materials we are familiar with, such as negative permittivity and permeability. Despite the relentless efforts by thousands of researchers, few metamaterials have been found at radio frequencies. On the other hand, countless papers on antennas and applied electromagnetics have been published in the name of metamaterials. Most of these papers do present new results, sometimes exciting; but, quite often, the structures reported don't fit into the definition of metamaterials which we aspire to find.

So, the question we ask is: “Do we broaden the definition of metamaterials to mean novel and inspirational materials, or do we just accept the fact that many papers on the subject are simply liberal users of the concept and the terminology and may not be directly related to any specific materials *per se*?” The trend seems to point to the former. This prompts us to ask the related question, “Where do we draw the line?”

In my opinion, if the phenomena we report are indeed exotic according to our understanding of the classical EM theory, we could either use the term “metamaterial” or “metamaterial-inspired” to describe them. If the antennas or devices we design exhibit superior performances but they can easily be explained by the traditional EM theory, we should call them what they actually are, instead of using the all-inclusive term “metamaterial” to describe them.

Using the term “metamaterial” to refer to a novel structure is tempting, but I fear its overuse may eventually be counterproductive, since we might not know what the word means any longer if we continue to use it too loosely. After all, words are used for communication. If the meaning of a word is too ambiguous, the word itself, as well as the initial concept it was intended to describe, may lose the significance they deserve.