

Magn. Reson. Discuss., community comment CC2  
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## Comment on mr-2022-17

Mike Bowman

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Community comment on "Intermolecular contributions, filtration effects and signal composition of SIFTER (single-frequency technique for refocusing)" by Agathe Vanas et al., Magn. Reson. Discuss., <https://doi.org/10.5194/mr-2022-17-CC2>, 2022

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This is an excellent consideration of the SIFTER signal under idealized conditions of perfect pulses and limited relaxation. The results are in good agreement with model experiments. They supply a theoretical basis for planning and for analyzing real SIFTER experiments. More realistic treatments will be made as needed to extend these results, for example, to finite width pulses, pulses with non-ideal turning angles, partial excitation of the spectrum, mixtures of monoradicals and biradicals. This work certainly deserves publication.

This paper is written in a verbally descriptive style where each formula and term is described verbally in preference to concisely describing it in equations. I find that style rather difficult to follow when the math is as extended as this. However, this style suits some people well and is preferred by them over styles that I would prefer. So I am not advocating a change of style and do not argue the merits of people's taste in styles. However, there are some things that the authors can do to make the paper more easily read and understood.

One of these is concerned with the notation and terms in the equations. EPR has many official and unofficial standards of terminology, but with many conflicts between the different sets. For example,  $\omega_0$  is often the microwave frequency of the spectrometer instead of the dipolar splitting of radical pair 0. Also,  $\omega_{dd}$  is often the dipolar frequency at a particular distance  $r$  and angle  $\theta$ , as defined in eq. 1 and used multiple times several pages later. Or it is the maximum frequency for a particular distance but the angular dependence is expressed separately. In addition, the many terms in the paper make it difficult to retain (or even find) their definition and use. So, I would find it a great help in reading this paper if there were a table listing all of the terms and meanings in sufficient detail to understand if  $\omega_{dd}$  is the dipolar splitting with angular dependence included, or if it is the dipolar interaction at a distance  $r$  with a separate angular term. Such a table would also make it easier to see the relevance and role of terms, which is difficult because there are so many used in the paper.

The long verbal descriptions makes it difficult for me to understand the form and significance of terms until I reached the figures at the end of the paper. But then I had to go back and reread the first 3/4 of the paper. I know that when I read it again, I will be constantly referring to the figures as I read section 2 and 4. I would recommend putting some schemes or diagrams in section 2 to illustrate the terms and their relationships and

reveal their significance. I think this is a case where each picture would be worth much more than a thousand words.

Finally, I notice some inconsistency in referring to equations and terms in the paper. Many of the equations are referred to later by their eq. number. But others, such as  $\sigma_1$  through  $\sigma_3$  are referred to by their name. I do not see that those terms ever appear on the right hand side of an equation, although I might have missed it. So, I am not clear why they would be given names in the first place.