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Magn. Reson. Discuss., author comment AC3
https://doi.org/10.5194/mr-2021-65-AC3, 2022

Reply on RC2

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Author comment on "Radiation damping strongly perturbs remote resonances in the presence of homonuclear mixing" by Philippe Pelupessy, Magn. Reson. Discuss., https://doi.org/10.5194/mr-2021-65-AC3, 2022

Dear reviewer,

Thanks for the careful reading of the manuscript and your comments, I have addressed the different points in a revised version of the manuscript in the following way:

-I would say, this manuscript does not make it easy for the reader to appreciate what is being found, other than there are clearly some RD effects. It would be helpful if the text could contain an interpretation of what is actually happening other than simply comparing simulation and experiment.

I think that I cannot go much further in the interpretation, other than the fact already stated that TOCSY sequences remove the offset contribution to the effective Hamiltonian, hence the wider reach of the weak RD field. I added a phrase in the conclusions to stress this point. Maybe the additions to the article in answer to your third point (the theoretical investigation of the DIPSI sequence for very high RF amplitudes), does provides a more thorough analysis of the phenomenon.

-The description of the validation / control experiments (modulating the H2O z-magnetization) experiments is also a bit brief, and it would be helpful to have more guidance for the reader.

I have extended the description in the methods and the results sections.

-There are further details, which I feel should be discussed. For example, what is the actual bandwidth of the DIPSI? What would happen if the bandwidth were infinite?

I added simulations with stronger RF amplitudes to the main text and the supporting information and simulations at different offsets of the spin-lock. I rationalized (in an appendix) the observed nutation rates in the simulations with very high RF fields on resonance with the solvent frequency. I prefer not to discuss the bandwidth (which does not have a clearcut definition in this case) and just give the RF amplitude. However, I added simulations in the supporting information with different RF amplitudes.

-Are the RD effects only a consequence of the non-ideality of DIPSI? If that is the case, the effects are perhaps not really so surprising?

Other sequences have been simulated, showing similar effects (added to supporting information). I think that (see also answer to previous comment), rather the opposite is the case: the better (more ideal) the sequence the stronger the effect (see also above and my answer to Tom Barbara in the discussion section, https://doi.org/10.5194/mr-2021-65-AC1).

-The description of the simulations is also unclear, was it performed for a spin-lock or for the actual multi-pulse sequence?

I think it is now clear that the actual multiple-pulse sequence has been simulated (see also the answer to the first reviewer), the code has also been included into supporting information.

Kind regards,

Philippe