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Comment on mr-2021-31

Anonymous Referee #2

Referee comment on "Heteronuclear and homonuclear radio-frequency-driven recoupling" by Evgeny Nimerovsky et al., Magn. Reson. Discuss., https://doi.org/10.5194/mr-2021-31-RC2, 2021

This is an interesting and potentially important manuscript, demonstrating the utility of simultaneous RFDR pi pulse trains on 15N and 1H as a means of transferring polarization from 15N to 1H and also transferring polarization among 1H spins. The authors show that long-range 1H-1H transfers are observed, which provide useful structural information. With numerical simulations, they explore dependences on resonance offsets that are important especially at lower MAS frequenices.

This paper is certainly suitable for publication in MR. My only recommendation is that the authors re-examine their choice of references in the Introduction. It is worth noting that the first examples of homonuclear dipolar recoupling (by Meier and Earl for 1H-1H couplings and by Tycko and Dabbagh for 13C-13C couplings and quantitative distance measurements) are not cited. The Ok paper is not about RFDR. What is now called RFDR was originally introduced by Gullion and Vega (and called SEDRA). The 2001 paper by Ishii analyzed finite-pulse effects in detail and showed that XY4 phase cycling produces an average homonuclear dipole-dipole Hamiltonian with the same operator form as in a non-spinning sample.