Magn. Reson. Discuss.,
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Interactive comment on "Nuclear spin noise tomography in three dimensions" *by* Stephan J. Ginthör et al.

Anonymous Referee #1

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This manuscript demonstrated 3D spin-noise imaging. While fundamentally, the work does not go beyond previously-demonstrated 2D spin-noise imaging, since the earlier demonstration there has been a lot of progress in understanding the spin-noise phenomenon, developing optimized processing strategies, describing spin-noise lineshapes, and optimal tuning conditions, all information that has gone into performing the 3D imaging work presented here. Therefore, I view this work as important in highlighting and summarizing critical aspects of spin-noise detection, and point to potential future applications. Furthermore, I find the image reconstruction in Fig. 2 particularly striking, especially given that pure spin noise is used to acquire the data. Given the weakness of the spin-noise signal, the work is also a demonstration of sensitivity limits of today's NMR spectroscopic equipment. The use and evaluation of the SART

technique is interesting, especially since it is not used much in image reconstruction. One (very) minor comment is that the conclusion says "spin-noise does not decay". This may be a bit misleading, since, spin-noise rather than decaying loses memory at a time scale of T2. Another minor comment would be that it may be useful to state whether SART could be implemented in a 3D fashion rather than in the pseudo-3D approach used here. Overall, I find this to be great and nicely executed work, which is a wonderful addition to the journal.

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