

Magn. Reson. Discuss., community comment CC4 https://doi.org/10.5194/mr-2022-9-CC4, 2022 © Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.

Comment on mr-2022-9

Tom Barbara

Community comment on "Visualization of dynamics in coupled multi-spin systems" by Jingyan Xu et al., Magn. Reson. Discuss., https://doi.org/10.5194/mr-2022-9-CC4, 2022

Without being more current on aspects of this topic as outlined by Steffen Glaser (CC3), I was initially reminded of the efforts put forward in the late 1970's on the topic of coherences and their visualization. As I remember it, it was Vega and Pines who would point out the analogies between spin coherences and angular momentum "orbitals". This did connect college chemistry to spin coherences, but never had much to add in efforts to understand dynamics. Rather, the dynamics would be visualized in some subspace that had favorable rotation-like properties, so that Bloch Sphere type pictures could be drawn. There were lots of ways of slicing the problem and, just as an example, I have an entire binder of notes on two spin ½ mapped onto spin 3/2 looking for dynamical groupings that offered some visual picture. Alas they were (almost) always limited in utility even though the few exceptions were of some interest for spin 1 and spin 3/2 or two coupled spin ½.

I sense that a similar situation holds for the pictures offered here. Furthermore, I agree with Malcolm's comments that the mathematical exposition is obtuse. Given that hurdle, who is going to master the language if it actually adds only an incremental insight?