

Magn. Reson. Discuss., referee comment RC1
<https://doi.org/10.5194/mr-2021-21-RC1>, 2021
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Comment on mr-2021-21

Claudio Luchinat (Referee)

Referee comment on "Characterization of nucleosome sediments for protein interaction studies by solid-state NMR spectroscopy" by Ulric B. le Paige et al., Magn. Reson. Discuss., <https://doi.org/10.5194/mr-2021-21-RC1>, 2021

The manuscript by le Paige et al. is an insightful view on solid-state NMR studies of the nucleosome and how to profitably analyze its interactions with partner proteins.

This manuscript reads very well and the SAXS characterization of nucleosome sediments is fascinating. There are some minor presentation flaws that can be very easily addressed, and that I here list in order of appearance in the text:

- 1) page 2, line 55. The sentence beginning with "Additionally, as opposed" could carry the same references as the previous sentence, plus the already cited Fragai et al. 2013.
- 2) To a non-specialist reader "interact in trans" might be quite obscure. Could it be briefly explained?
- 3) line 65, "as shown" instead of "shown"
- 4) The sentence on page 3, line 67 is particularly important for the development of the manuscript. However, it is not particularly well written, nor emphasized properly. I suggest rewriting. For instance, reversing the order giving first the potential problems, then explaining how the potential problems are ruled out in this work.
- 5) Please follow IUPAC recommendations: avoid "molar" and express concentrations in mol/dm³ or mmol/dm³ instead of M or mM.
- 6) Still on the emphasis of the different parts, I think that a break at line 74 would be beneficial: "As a test case" would be the beginning of the new paragraph.
- 7) Line 124: Perhaps references to the rotor filling devices described in [10.1007/s10858-009-9374-3](https://doi.org/10.1007/s10858-009-9374-3) and [10.1007/s10858-012-9657-y](https://doi.org/10.1007/s10858-012-9657-y) could be appropriate.
- 8) Line 136: Processing parameters (apodization function, zero-filling, etc...) are missing. Please provide them.
- 9) Line 147: the scattering angle theta is generally given lowercase
- 10) Line 175: the amount of residual protein in the supernatant at equilibrium can be

calculated by numerical integration over the rotor filling device ([10.1007/s10858-012-9657-y](https://doi.org/10.1007/s10858-012-9657-y), [10.1007/s10858-013-9795-x](https://doi.org/10.1007/s10858-013-9795-x) and <http://py-enmr.cerm.unifi.it/access/index/sednmr>). Do the experimental results match the predictions?

11) Line 179: the viscous droplet is visible in one of the figures of the "Narasimhan et al. 2021" reference. Why not repeat that photo here?

12) Line 184: the concept of "limiting concentration" is rather intuitive, but not typical of standard sedimentation literature, as concentrated solutions are rarely used ([10.1016/0003-9861\(85\)90382-0](https://doi.org/10.1016/0003-9861(85)90382-0) and [10.1002/pol.1980.180180909](https://doi.org/10.1002/pol.1980.180180909)). This concept has been introduced in the equations describing sedimentation in this paper: [10.1039/C1CP22978H](https://doi.org/10.1039/C1CP22978H).

13) Line 207, add a comma: "We conclude that while"-> "We conclude that, while"

14) Paragraph 3.4: Co-sedimentation in NMR has been described theoretically in [10.1021/ar300342f](https://doi.org/10.1021/ar300342f) and applied in [10.1007/s10858-016-0018-0](https://doi.org/10.1007/s10858-016-0018-0). Please include these references