

Interactive comment on “Increased flow rate of hyperpolarized aqueous solution for DNP-enhanced MRI achieved by an open Fabry-Pérot type microwave resonator” by Alexey Fedotov et al.

Anonymous Referee #1

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mr-2020-20 manuscript “Increased flow rate of hyperpolarized aqueous solution for DNP-enhanced MRI achieved by an open Fabry-Pérot type microwave resonator” Alexey Fedotov, Ilya Kurakin, Sebastian Fischer, Thomas Vogl, Thomas F. Prisner, and Vasyl Denysenkov

General comments:

This is a new and thorough study describing the development and testing of new open Fabry-Perot resonator for applications in DNP/MRI experiments. The research is top-

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ical and well justified; the results are of high quality and are nicely presented in the paper. The authors achieved two-fold increase in signal enhancement compared to cylindrical resonator in similar conditions, but more important, they outlined possible directions for further development in continuous flow polarizers for DNP. The research is well planned, it starts from simulations and continues to construction of the resonator and then its testing using phantom system inside 1.5 T MRI scanner.

In my opinion, this paper can be published as is. However, I provide some comments which authors might wish to consider in the final version of the paper.

Specific comments:

1. Thinking about a broad reader in fields of NMR/EPR/DNP, it would be good to explain the choice/influence of such parameters used as TEMPOL concentration (28 mM) and temperature of water in the resonator. Do these parameters impact the generation/relaxation of polarization critically in current setup or not?
2. It is conceivable that heating of water by microwaves lowers its viscosity and makes the flow faster. The comment on pros and cons of this would be welcome, especially since the 'flow rate' is in the title of the paper.
3. Can any strategies of external cooling be foreseen for this type of the resonator?

Technical corrections:

The paper is written very well and clearly. Only a few typos were found:

Line 226: "volume, which agreed very with the value" lacks the word "well"

Lines 316-317: please, change "planed" to "planned", and maybe reformulate "supervised DNP supervision"

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