

## Reviewer Report

**Manuscript Number:** mr-2020-20

**Title:** "Increased flow rate of hyperpolarized aqueous solution for DNP-enhanced MRI achieved by an open Fabry-Pérot type microwave resonator"

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Focus of the manuscript is the design and construction of a microwave structure that allows for improved saturation of EPR transitions in Overhauser DNP applied to MRI investigations at high magnetic field (1.5 T). The development of the hardware is a very nice piece of work; the achieved signal enhancement is quite substantial. The potential in real MRI application, however, is not satisfactorily discussed, whereas the problems of alternative methods got much space in the Introduction; for example, drawbacks of Gd-based contrast agents are discussed, while disadvantages of nitroxide dopants as used here stay unmentioned. The concluding sentence of the manuscript on angiography applications is, therefore, not compelling and must be modified.

Also, part of the text seems to be written only for the small group of microwave specialists, but not for the general magnetic resonance community. As an example, the parameter  $S_{11}$  in Figures 3 and 8 is taken as granted, but should be defined; in Figure 4 and in Conclusion the microwave field  $B_1$  is given in the strange unit of A/m. Some modifications could improve the manuscript considerably. Also, reason for the choice of TEMPOL as radical dopant is missing; choosing the concentration of 28 mM stays unsubstantiated, although it probably affects the proton  $T_1$  relaxation.

In summary, the manuscript is not yet coherently written and needs modification before it is suited for publication.

There are a few minor points listed below that the authors should also reconsider.

line 34: change to "optically"

line 175, Figure 5: use a photo of better contrast

line 210, Figure 7: define the dark brown parts on the right side of the assembly

line 316: change: "supervised DNP supervision"