

Magn. Reson. Discuss., community comment CC1
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Reply on RC1

Aaron Himmler

Community comment on "Electroplated waveguides to enhance DNP and EPR spectra of silicon and diamond particles" by Aaron Himmler et al., Magn. Reson. Discuss., <https://doi.org/10.5194/mr-2022-15-CC1>, 2022

Thank you for your careful read and the very detailed input. Most points will then be adapted straight away, since they improve readability/ understandability indeed.

While low losses in quasi-optical setups or corrugated waveguides seem very good in theory, it is important to remember that the necessary microwave conversions are not that efficient in practice (mode converters, focusing/tapering up and down). For a very long transmission line these solutions would definitely be my choice.

The corrugated waveguide in (doi: 10.1109/irmmw-THz.2011.6105103) does a fantastic job. But I assume it has high heat conductivity as well. If high helium consumption for cooling was not an issue, this would be an interesting option. Ideally we would have a waveguide like this made from thin steel, plated with silver.

Yes, we have 304 stainless steel. I am not concerned, since DNP has to live with quite broad lines anyways. Also our cryostat is slightly magnetic. This has a greater effect anyways. XD

It would be interesting to know the thickness of the silver layer, but we cannot verify it ourselves. And for a measurement open access to the surface would be necessary as far as I know. That means opening up a completely fine, plated and MW-attenuation verified waveguide. I am not so keen on doing that. Of course I can just plate a blank piece of steel, but this will affect the plating process, so it is not the same.