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Interactive comment on "Open-source, 3D-printed, high-pressure (50 bar) liquid-nitrogen-cooled *para*-hydrogen generator" *by* Frowin Ellermann et al.

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Given that parahydrogen-based research area keeps growing rapidly, I believe that this work will be of intetrest and use for many researchers, and particularly to those who consider entering the field. Therefore, in my opinion the paper should certainly be published.

Provided below are some suggestions for the authors which may further improve the manuscript.

1) From the title, I had an impression that the generator or at least its key parts were

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Discussion paper

3D-printed, which, as I found later, was not the case. I believe it may be a good idea to refine the paper title. 2) As always, I'm advocating the spelling of "parahydrogen" and "orthohydrogen" as single words without a dash, which I believe is the only correct way to spell them (cf. paratrooper, parabola, orthophosphoric acid; also in dictionaries, e.g., https://www.thefreedictionary.com/parahydrogen). 3) The word "allotrope" in the reference to parahydrogen is acceptable in the historic context, but in fact is incorrect. By definition, allotropy is the existence of a chemical element in two or more forms, which may differ in the arrangement of atoms in crystalline solids or in the occurrence of molecules that contain different numbers of atoms (e.g., graphite, charcoal, diamond, fullerenes). Parahydrogen is this not an allotropic form of H2 but rather its nuclear spin isomer. 4) line 40, naphthalene derivative (Stevanato et al., 2015) cannot be classified as spin isomer as it is not symmetric, so that the generalized Pauli principle is not applicable to it. 5) Line 39, water (Mammoli et al., 2015; Meier et al., 2015) was not enriched in the Mammoli paper experiments, or at least could not be extracted to RT. A better reference to spin isomers of free water would be to the molecular beam separation experiments (e.g., doi: 10.1126/science.1200433 or 10.1021/acs.jpca.9b04294). 6) There are a couple of very recent papers describing different parahydrogen generator designs which the authors may wish to cite, doi: 10.1021/acs.analchem.0c03358 doi: 10.1016/j.jmr.2020.106869

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