

Interactive comment on “Cavity-enhanced photoacoustic sensor based on a whispering-gallery-mode diode laser” by Yufeng Pan et al.

Anonymous Referee #2

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This manuscript describes the photoacoustic (PA) detection of acetylene (C₂H₂) using a compact cavity-enhanced PA sensor in combination with a near-IR whispering-gallery-mode (WGM) diode laser. The paper is clearly written and the results are well documented. However, the paper lacks some major points which should be addressed in a revised version. The following issues need to be taken into account:

General comments 1. What is the exact role of the WGM diode laser, i.e. why WGM? I understand that the linewidths are of WGM diode lasers are much narrower than those of usual diode lasers but how do measurements at atmospheric pressure benefit from these narrow laser linewidths, i.e. what would be different if a “simple” diode laser

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was used? 2. The detection limit for C₂H₂ in this paper is not outstanding. In fact, some previous results of PA detection of C₂H₂ were superior (see e.g.: 33.2 ppb by Yufei Ma et al. in *Appl. Phys. Lett.* 110, 031107 (2017)). A comparison and discussion of previously achieved results for C₂H₂ using similar techniques is mandatory, e.g. Jingsong Li et al. in *Opt. & Laser Techn.* 39, 1144 (2007) or Y. Cao et al. in *Appl. Phys. B* 109, 359 (2012) and others. The pros and cons of the present setup with respect to previously used setups should be clearly stated and discussed in detail. 3. Figures 1, 2, 4 and 7 could eventually be skipped without much loss of information which is given in the text. 4. References: most are references by the authors or co-authors themselves. Additional refs. (incl. those mentioned in point 2) but also others. For example, it is not common to cite just references from own work in a general introductory sentence like on p.1, line 19 (by the way, there it should also be differentiated between Yin et al. 2017a and b).

Minor points 5. The first time WGM-diode laser appears it should be written as Whispering-gallery-mode (WGM)-diode laser (p. 2, line 16). 6. p. 3, line 29: A mode-matching lens (L1),... 7. Fig. 7: The color coding in the inset (CPA sensor (black) and CEPA sensor (red) should be changed to match the order of the measurements, i.e. CEPA on top, CPA at the bottom. However, this figure (see point 3 above) could eventually be skipped.

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