You mentioned two papers that we published before in your email [1,2].

The first proceedings paper [1] contains only a short additional study that we performed after writing the submitted paper. This study applies explainable machine learning techniques to understand which range of excitation frequencies contains the most information to achieve a good prediction. It was a short proceedings paper for a conference. The result (see Figure 5) is new and not present in the submitted paper.

The second paper [2] is a purely theoretical study on multi-dimensional regression problems to demonstrate that they can be solved using multi-tasking neural network architectures and which architectures are most appropriate for this type of problems. As example synthetic data were generated using the classical Stern-Vollmer equation which is a well-known and best accepted analytical model for this type of sensors.

The manuscript submitted to Sensors uses the network architecture, which was previously found to work best. It is typical of scientific work to start from previous findings, without redoing the same work again. However, the work which we would like to publish is not about which network architecture work best for a theoretical type of problem.

The following results are completely new in the submitted paper and never published before:

* we built a real physical optical sensor, we characterized and used for the acquisition of data needed for the training and we demonstrate a sensor performance which would not be possible with a standard approach. Secondly, the paper submitted here for publication does much more. It defines how the data acquisition should be carried out, which is essential to a sensor based on machine learning.
* furthermore, we introduce a new metric, the Error Limited Accuracy, which bridges the gap between two fields: physics and computer sciences. We strongly believe this metric is necessary for the characterization and, thus, the spreading of a new generation of sensors into applications.
* the experimental result per se (Figs. 4 to 6) are new, unpublished and, to the best of the authors’ knowledge, of unprecedented detail and quality as compared to any previous publications of this type of sensor since span thoroughly in a four-dimensional space (oxygen concentration, temperature, modulation frequency and phase shift).

In conclusion, this work demonstrates that a new generation of sensor which are based on the proposed approach is not only possible but would work better than the conventional ones. This work thus represents a paradigm shift. This is the reason why we strongly think the work is of great relevance for the public of Sensors and for the optical community in general and should be published on Sensors.

[1] <https://www.spiedigitallibrary.org/conference-proceedings-of-spie/11354/113541C/Dual-oxygen-and-temperature-sensing-with-single-indicator-using-multi/10.1117/12.2554941.short>

[2] <https://digitalcollection.zhaw.ch/bitstream/11475/18733/2/2019_Venturini_MultiTask%20Learning%20for%20MultiDimensional%20Regression_ApplSci.pdf>