To: Professor Francesco Lamonaca

Editor in chief,

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**Original paper submission**

**Title**: Application of wearable EEG sensors for indoor thermal comfort measurements

**Authors**: Silvia Angela Mansi, Ilaria Pigliautile, Camillo Porcaro, Anna Laura Pisello, Marco Arnesano\*

Dear Editor,

We are pleased to submit an original paper about the study we performed about the application of wearable EEG sensors for indoor thermal comfort measurements. The work is part of the PRIN 2017 project called NEXT.COM, which aims at developing a frontier breakthrough of comfort investigation in the built environment by testing and validating a brand new multiphysics, multidomain and multisensorial comfort experimental measurement protocol and exhaustive analytic interpretation model.

In this framework we are exploring the applicability of wearable sensors for the acquisition of physiological data to be used in conjunction with environmental data for human thermal comfort measurements. One of the physiological signals considered in the project is the EEG (electroencephalography) since thermal comfort has been widely correlated with the brain activity. In this field, wearable EEG sensors with few electrodes could be a promising technology for comfort measurements since they are portable and less intrusive with respect to the medical devices that are generally used for such experiments. However, wearables provide lower accuracy, lower resolution and are sensitive to artefacts. For this reason, a study to investigate the applicability of one commercial EEG wearable sensor was performed. The manuscript presents results from its application to an experimental campaign conducted on 23 subjects and in a controlled environment where thermal conditions were changed to create warm, cold and neutral sensations. A data processing procedure was developed and applied to reduce noise and artefacts. Then, features from EEG brain waves were extracted and analysed. Results from statistical analysis demonstrated that the measurements done with the wearable device could be used to distinguish warm and cold sensations.

The manuscript represents an original work that has not been published previously and is not currently being considered by another journal. Also, we confirm that each author has seen and approved the contents of the submitted manuscript.

The submission is for the Special Section on the "Measurement Day 2021". We are pleased to suggest the following reviewers:

* Alessandra Luna Navarro (a.lunanavarro@tudelft.nl)
* Gloria Cosoli (g.cosoli@staff.univpm.it)
* Luis Miguel Blanes Restoy (luismiguel.blanesrestoy@nuigalway.ie)

Thank you for your consideration of our work. Please address all correspondence concerning this manuscript to me at marco.arnesano@uniecampus.it

Kind regards,



Corresponding author, on behalf of the authors.