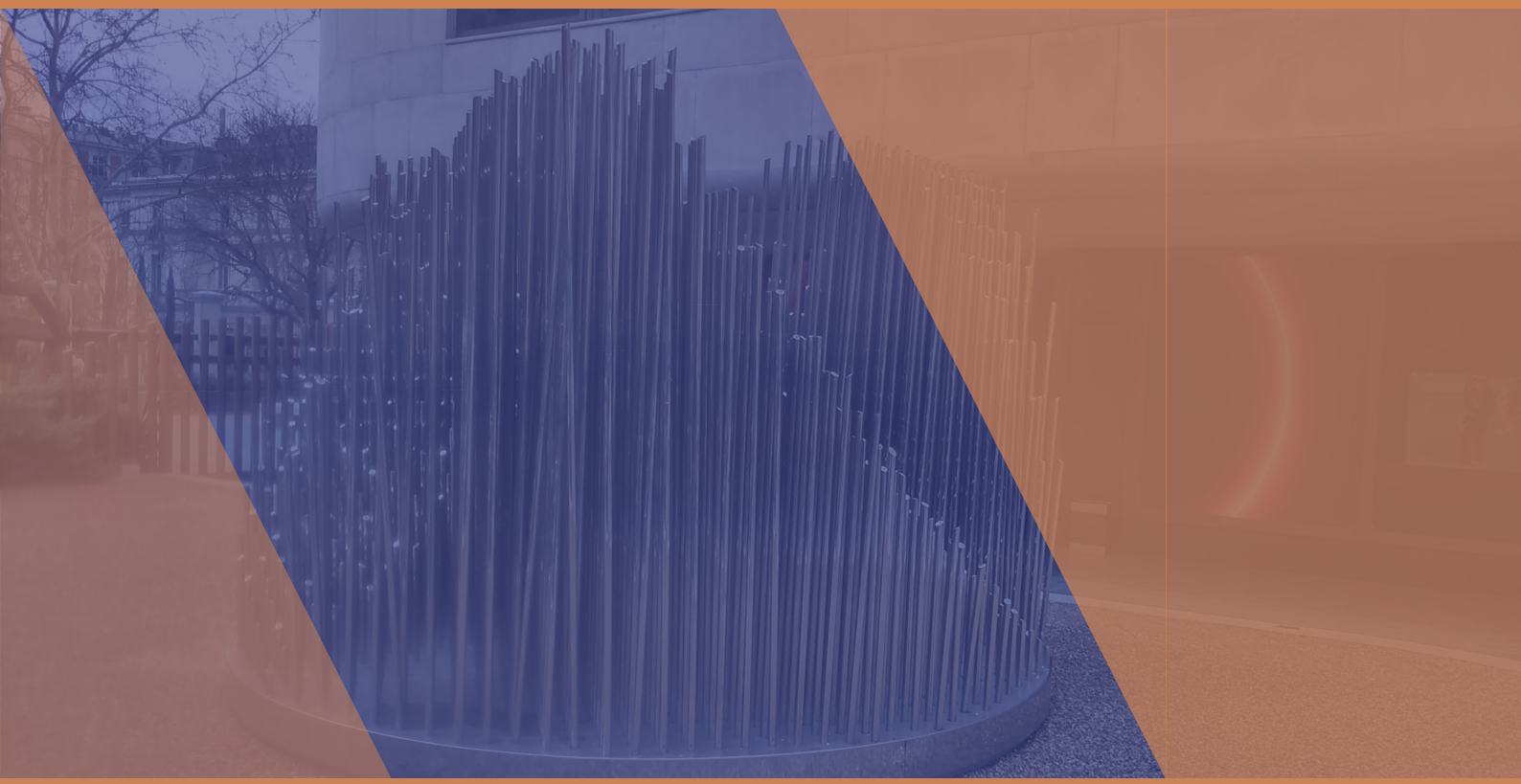
Symposium on Acoustic Metamaterials

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Book of abstracts

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Perfect acoustic absorption in deep sub-wavelength structures for the ventilation problems

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In this work we report a mechanisms providing symmetric perfect acoustic absorption by sub-wavelength structures in the ventilation problem. While in the problem of reflection the mechanism consists in critically coupling a single reso- nance independently of its nature, the problem of transmission becomes more complicated and a degenerate resonator with symmetric and antisymmetric resonances should be designed with both resonances critically coupled. The system analyzed in this work is made by a panel with a periodic distribution of slits, the upper wall of which are loaded by Helmholtz Resonators. The propagation in the slit is highly dispersive due to the presence of the resonators, producing a slow sound propagation before the resonance, and down shifting it to low frequencies. By controlling the geometry of the resonator, the visco-thermal losses can be tuned in order to compensate the leakage of the system and fulfill the critical coupling condition so activating the perfect absorption of sound. In the case of transmission, a double slit is needed, one acting as symmetric and the other one as antisymmetric resonators.

Keywords: Acoustic Metamaterials, Perfect absorption, Critical coupling, Degenerate resonators

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