



MADRID

inter.noise 2019

June 16 - 19

NOISE CONTROL FOR A BETTER ENVIRONMENT

Low-Frequency Sound Absorbers via Spiral Metasurfaces with Recessed Necks

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ABSTRACT

In this work we present quasi-perfect acoustic absorbers via spiral metasurfaces composed of coiled channels and recessed necks. Perfect absorbers with absorption coefficients reaching 0.999 in experiments are realized with an ultra-thin thickness around 1/100th of the operating wavelength. Owing to the superior impedance manipulation provided by the recessed necks, perfect absorptions with tunable frequencies and bandwidth are demonstrated, showing the excellent agreement between the analytical predictions and experimental measurements. Our results would contribute to pave a way towards designing thin and light absorbers for the low frequency absorption challenge.