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Mass production of monodisperse microbubbles for real applications avoiding microfluidics ENRIQUE JESUS SANCHEZ QUINTERO, ALVARO EVANGELIO, JOSE MANUEL GORDILLO, Escuela superior de Ingenieros, Universidad de Sevilla — In this presentation we report experiments showing the effect on the controlled generation of microbubbles of the pressure gradient imposed by the relative flow of a liquid stream around an airfoil-shaped solid. Taking advantage of the conclusions in Evangelio et al. JFM 2015, 778, 653-668, where the local pressure gradient was identified as the mechanism responsible of the generation of microbubbles in microfluidic devices and, with the purpose of overcoming the low production rates associated with these kind of microdevices, we have used the same physical principle but have applied it to a totally different geometry: a rectangular planar wing composed by symmetrical airfoils. The relative velocity field is imposed either submerging the static wing within a flowing hydraulic channel or by rotating the wings within a reservoir containing the otherwise quiescent liquid mass. We provide physical insight on the bubbling process and deduce a scaling law which expresses the diameters of the bubbles formed as a function of the gas flow rate, relative liquid velocity and the angle of attack of the incident flow. In spite of the geometry is totally different, we recover the same results obtained using microfluidic devices but with much higher production rates.

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