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Influence of pressure gradient on formation speed of a turbulent separation bubble[1] KORCAN DAU, BEN STEINFURTH, JULIEN WEISS, TU Berlin — A turbulent separation bubble (TSB) is generated as a turbulent boundary layer separates from the solid surface of a one-sided diffuser and reattaches further downstream. Here, flow separation is brought about abruptly by switching off an active flow control system that initially forces an attached flow. Depending on the magnitude of the adverse pressure gradient which can be manipulated by adjusting the diffuser opening angle, the formation speed of the TSB varies. We investigate the transient separation process by measuring the wall shear stress along the diffuser axis using novel calorimetric MEMS sensors. The present study provides new insights into the flow physics of TSBs. Furthermore, active flow control applications may benefit from our results as knowledge regarding the separation velocity may promote a more informed selection of actuation parameters.

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