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Interaction of Suction and Pulsed Blowing with a Laminar Boundary Layer AVRAHAM SEIFERT, Tel Aviv Univ, LIAD MAROM, Tel Aviv Univ. — The presentation will describe a fundamental study of active flow control (AFC) using the steady suction and oscillatory blowing actuator (SaOB), identifying its effects on a laminar boundary layer. Recent experiments showed this effective and efficient actuator as a drag reduction device .....[e.g., Wilson et al, AIAA J, 2013]. However, improved fundamental understanding of the boundary layer (BL) interaction with suction and oscillatory blowing and the combination of these two effects in close proximity is desired. The current experiment, performed in a laminar flow, will result in improved efficiency of the actuator and will enable development of a reliable predictive capability of this flow control method. The interaction with a laminar BL is crucial for the project due to the lack of interaction with the random turbulence, the thicker BL and lower skin-friction that enables greater effect of the controlled BL. Furthermore, fundamental interaction principles could be easier to identify and understand in laminar flows, where critical trends will not be masked by turbulence, and the averaging process will better represent the time dependent flow. The results demonstrate that while the oscillatory blowing is robust and has a strong effect on the flow evolution, the steady suction introduced upstream has a crucial role in the efficient operation of the AFC system.

Avraham Seifert
Tel Aviv Univ

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