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Drag reduction due to spatial thermal modulations JERZY M. FLORYAN, University of Western Ontario, DANIEL FLORYAN, Cornell University — It is demonstrated that a significant drag reduction for pressure driven flows can be realized by applying spatially distributed heating. The heating creates separation bubbles that separate the stream from the bounding walls and, at the same time, alters distribution of the Reynolds stress providing a propulsive force. The strength of this effect is of practical interest for heating with the wave numbers 0(1) and for flows with small Reynolds numbers and, thus, it is of potential interest for applications in micro-channels. The strength of the effects can be increased by using heating with a non-zero mean. The drag reducing effect increases proportionally to the second power of the heating intensity. This increase saturates if the heating becomes too intense.

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