

Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Drag reduction of a hairy disk JUN NIU, Peking University, DAVID HU, Georgia Institute of Technology — We investigate experimentally the hydrodynamics of a hairy disk immersed in a two-dimensional flowing soap film. Drag force is measured as a function of hair length, density and coating area. An optimum combination of these parameters yields a drag reduction of 17%, which confirms previous numerical predictions of 15% by Favier et al (2009). Flow visualization indicates the primary mechanism for drag reduction is the bending, adhesion and reinforcement of hairs trailing the disk, which reduces wake width and traps “dead water.” Thus, the use of hairy coatings can substantially reduce an object’s drag while negligibly increasing its weight.

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Date submitted: 10 Aug 2011

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