

Abstract Submitted  
for the DFD11 Meeting of  
The American Physical Society

**Shear stress and particle removal measurements of a turbulent air jet impinging normally upon a surface** RYAN YOUNG, MICHAEL HARGATHER, GARY SETTLES, Gas Dynamics Lab, Penn State University — When a jet of air impinges normally upon a surface, it imposes a shear stress parallel to the wall in all directions from the impingement point. Particle removal from that surface is assumed to be mainly due to that imposed shear stress. But that shear stress has been difficult to measure and has, in the past, been inferred from particle removal rates. Here we make a basic measurement of mean shear stress imposed upon a planar wall by a normally-impinging turbulent air jet using the technique of oil-film interferometry. The resulting shear-stress distribution is then compared with the removal rates of latex microspheres from a planar glass surface as a function of the distance from jet impingement normalized by the height of the nozzle above the surface. The particle removal experiments are carried out with sparse (few particle collisions) particle distributions. These experiments show that the efficiency of particle removal is directly but not linearly related to the imposed shear stress. A distinct shear stress threshold was found, below which little or no particle removal occurred.

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Date submitted: 12 Aug 2011

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