

Abstract Submitted  
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**Experimental** **Evaluation**  
**of Swirling Jet Growth Rate Enhancement**<sup>1</sup> BRYON RIOTTO, RICHARD SEMAAN, JONATHAN NAUGHTON, University of Wyoming — The growth rate in the developing region of a free jet with swirl is known to be a function of the swirl number  $S$ , the ratio of the angular momentum flux to the axial momentum flux. At low swirl numbers, the growth rate is relatively unaffected, and at high swirl numbers the growth rate becomes saturated. Planar Mie Scattering (PMS) is used to determine the degree of growth rate enhancement due to swirl at Reynolds numbers of 50,000 and 100,000 and over a range of swirl numbers from  $0.0 < S < 0.4$  in increments of 0.025. The swirl numbers at the nozzle exit for all of the cases are determined from velocity profiles measured using a two-component Laser Doppler Anemometer. Growth rates are calculated from the PMS flow visualization images over a range of 6 to 14 nozzle diameters. Two different swirl profiles, solid body rotation and a q- vortex, are examined. The level of swirl where the growth rate becomes a strong function of swirl, its behavior with increasing swirl, and where it becomes saturated are resolved in this study.

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Jonathan Naughton  
University of Wyoming

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