

Abstract Submitted
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Tip Gap Flow Control of A Pak-B Turbine Blade¹ JULIA STEPHENS, TRAVIS DOUVILLE, THOMAS CORKE, SCOTT MORRIS, University of Notre Dame — A high-speed linear cascade is used to investigate passive and active approaches for controlling the over-tip leakage flow associated with the turbine blades in the low-pressure stage of a gas turbine engine. The cascade consists of Pratt & Whitney “PakB” blades with varying gap sizes ranging from 0.5 to 5.0 percent of the blade axial chord. Reynolds numbers between 100K and 500K that correspond to tip relative Mach numbers of 0.04 to 0.21 were investigated. Pressure ports on the endwall as well as at the midspan and tip of the blade are used to evaluate the flow. Additionally, a five-hole probe that was traversed in the blade wakes was used to determine total pressure loss coefficients and local velocity vectors. Two types of flow control devices were investigated. One consisted of a passive partial “squeeler” tip that locally reduced the gap size. The other consisted of a plasma actuator located on the blade tip was designed to produce unsteady disturbances which were receptive to the over-tip flow jet and shear layers. The effects of both these approaches are contrasted.

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Thomas Corke
University of Notre Dame

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