

Abstract Submitted
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Improving Wind Turbine Efficiency with Plasma Actuators JOHN COONEY, THOMAS CORKE, ROBERT NELSON, University of Notre Dame — As increasing the efficiency of modern wind turbines becomes more difficult, the use of active flow control now represents a more attractive means of possible improvement. This ongoing study examines utilizing single dielectric barrier discharge (SDBD) plasma actuators on wind turbine rotors to increase power generation. Blade element momentum (BEM) theory is used to identify regimes with the greatest potential for improvement and to estimate possible gains. Wind tunnel tests are conducted with plasma actuators to determine the amount of aerodynamic control achievable. In addition, the scope of a new “Laboratory for Enhanced Wind Energy Design” is outlined. Most critically, this resource includes two full-scale wind turbines to balance the known limitations of existing theory and wind tunnel testing by providing the capability to test novel blade designs and control strategies in the field.

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