Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Effects of the Layout of DBD Plasma Actuators on its Anti-/De-Icing Performance for Aircraft Icing Mitigation[1] CEM KOLBAKIR, HAIYANG HU, YANG LIU, HUI HU, Iowa State University — An experimental study was performed to evaluate the effects of different layouts of DBD plasma actuators on their anti-/de-icing performances for aircraft icing mitigations. An array of DBD plasma actuators were designed and embedded on the surface of a NACA0012 airfoil/wing model in different layout configurations (i.e., different alignment directions of the plasm actuators (e.g., spanwise vs. streamwise), width of the exposed electrodes and the gap between the electrodes). The experimental study was carried out in the Icing Research Tunnel available at Iowa State University (i.e., ISU-IRT). While the dynamic anti-icing operation is recorded by using a high-resolution imaging system, a high-speed Infrared (IR) thermal imaging camera is used to quantitatively map the temperature distributions over the surface of the airfoil model during the anti-/deicing processes. The findings derived from the present study are very helpful to explore/optimize design paradigms for the development of novel plasma-based anti-/de-icing strategies tailored specifically for aircraft inflight icing mitigation to ensure safer and more efficient aircraft operation in atmospheric icing conditions. -/abstract- Cem Kolbakir, Haiyang Hu, Yang

[1]11The research work is supported by National Science Foundation under award numbers of OISE1826978, CBET- 1916380 and CMMI-18248400 and Iowa Energy Center of the State of Iowa

Hui Hu
Iowa State University

Date submitted: 01 Aug 2019 Electronic form version 1.4