Abstract Submitted
for the GEC14 Meeting of
The American Physical Society

The formation of a turbulent front in a time modulated argon APPJ[1] SHIQIANG ZHANG, EDDIE VAN VELDHUIZEN, Department of Applied Physics, Eindhoven University of Technology, the Netherlands, PETER BRUGGEMAN, University of Minnesota, Department of Mechanical Engineering, 111 Church Street SE, Minneapolis, MN 55455, U.S.A., ANA SOBOTA, Department of Applied Physics, Eindhoven University of Technology, the Netherlands — Cold atmospheric pressure plasma jets (APPJ) are promising tools for biomedical applications such as wound healing, disinfection, decontamination, and material processing. The jet effluent is blown in an open air environment which leads to air diffusion and argon-air mixtures in the effluent flow. Since the reactive species carried by the flow are important in such kinds of applications, knowledge of the characteristics of the flow are crucial for understanding the distribution, evolution, transport, and chemical reactions of these reactive species. The flow dynamics of an non equilibrium argon-based atmospheric pressure plasma jet (APPJ) is investigated in this work. Shadowgraphy results show that turbulent front appears when the plasma is switched on and off and the laminar length of the flow during the plasma on phase is shorter than that during the plasma off phase. Time resolved gas temperature profiles obtained by Rayleigh scattering are used to explain the formation of the turbulent front when the plasma is switched on and off and the reduction of the length of the laminar flow.

[1]The funding is partly from STW

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Date submitted: 10 Jun 2014 Electronic form version 1.4