Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Low Power Low Temperature Plasma Devices for Surface Decontamination. SOPHIA GERSHMAN, SHURIK YATOM, Princeton Plasma Physics Laboratory, MARIA HARREGUY-ALFONSO, New Jersey Institute of Technology, YEVGENY RAITSES, Princeton Plasma Physics Laboratory, GAL HASPEL, New Jersey Institute of Technology, PHILLIP EFTHIMION, Princeton Plasma Physics Laboratory, PCRF COLLABORATION — The COVID-19 pandemic has brought to the forefront the need for effective disinfection and treatment for personal, medical, and public preparedness for biological emergencies. Low power (˜1 W) low temperature plasma (LTP) devices that can provide personal and possibly public protection against current and future infections due to their bio active properties (such as reactive radical and non-radical atomic and molecular species, electrons, currents, electric fields, UV, etc.). A surface dielectric barrier discharge (DBD) using a flexible printed circuit design operates in ambient air without any additional gas flow and power density of <0.5 W/cm^2. Using E-coli, we demonstrate a $4\log_{10}$ reduction of the bacterial load on a glass surface in direct contact with the device. An added dramatic improvement of surface disinfection results from a combined action of plasma and a common disinfectant. We discuss the efficacy of other DBD devices operating without a gas flow in ambient air. This research was performed at the Princeton Collaborative Low Temperature Plasma Research Facility (PCRF) at PPPL, and supported by the US DOE under contract DE-AC02-09CH11466.

Sophia Gershman
Princeton Plasma Physics Laboratory

Date submitted: 01 Jul 2020 Electronic form version 1.4