Abstract Submitted for the GEC13 Meeting of The American Physical Society

The electrodynamics of aerosols and bacteria in a microplasma¹ P.D. MAGUIRE, C.M.O. MAHONY, University of Ulster, D. DIVER, University of Glasgow, D. MARIOTTI, University of Ulster, E. BENNET, H. POTTS, University of Glasgow, D.A. MCDOWELL, University of Ulster — The physics of living organisms is considered a grand challenge of science. Plasma interactions with living organisms, particularly at atmospheric pressure, offer a unique opportunity to study the physical mechanisms and surface electrodynamics of individual microorganisms. The impact on the plasma of such macroscopic entities is itself important; the dynamics of non-spherical and non-rigid nano-/micro-scale structures have received little attention. Also the plasma interaction with water, from molecules to droplets, is becoming increasingly significant due to induced chemistries that differ considerably from conventional plasma chemistry. We investigate the bulk and surface physical properties of individual microorganisms, particularly bacteria, through electrical and visco-mechanical excitation. Individual organisms are transported by water droplets to an rf microplasma. Their impact on the plasma is determined by imaging, optical and electrical diagnostics. We report, using imaging, electrostatics and simulation, on (i) fluid stability under evaporative stress of charged microbecarrying macroscopic droplets, (ii) impact of the plasma on the stochastic component of motion and (iii) the acquired charge distribution and transfer from liquid to lipid surface.

¹Engineering and Physical Sciences Research Council EP/K006088, EP/K006142

P.D. Maguire University of Ulster

Date submitted: 14 Jun 2013

Electronic form version 1.4