Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Electron cross-sections and transport in liquids and biomolecules
RONALD WHITE, M. CASEY, D. COCKS, D. KONVALOV, James Cook University, M. J. BRUNGER, Flinders University, G. GARCIA, CSIC, Z. PETROVIC, Institute of Physics, Belgrade, Serbia, R. MCEACHRAN, S.J. BUCKMAN, Australian National University, J. DE URQUIJO, Universidad Nacional Autónoma de México — Modelling of electron induced processes in plasma medicine and radiation damage is reliant on accurate self-consistent sets of cross-sections for electrons in tissue. These cross-sections (and associated transport theory) must accurately account not only the electron-biomolecule interactions but also for the soft-condensed nature of tissue. In this presentation, we report on recent swarm experiments for electrons in gaseous water and tetrahydrofuran using the pulsed-Townsend experiment, and the associated development of self-consistent cross-section sets that arise from them. We also report on the necessary modifications to gas-phase cross-sections required to accurately treat electron transport in liquids. These modifications involve the treatment of coherent scattering and screening of the electron interaction potential as well as the development of a new transport theory to accommodate these cross-sections. The accuracy of the ab-initio cross-sections is highlighted through comparison of theory and experiment for electrons in liquid argon and xenon.

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Date submitted: 20 Jun 2016 Electronic form version 1.4