Abstract Submitted
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Applying a Trochoidal Electron Monochromator in Dissociative Electron Attachment Scattering ESMERALDA ARREOLA, California State University, Fullerton — Since the pioneering work of Boudiaffa et al. [1], it has been understood that electrons, even with energies near or below the ionization threshold, are capable of initiating strand-breaks in human DNA. This discovery raised important questions for cancer treatments, since sub-ionizing electrons are known to be the most copiously produced secondary product of radiation therapy. But even to date these factors are largely excluded from dosimetry calculations. This lack of inclusion is, at least in part, certainly due to the dearth of fundamental data describing low-energy electron interactions with nucleotide molecules that form the basis of DNA. Understanding of how such slow electrons are able to damage DNA remains incomplete, but the strongly peaked nature of Boudiaffa et al.'s data gives strong hints at resonantly driven collision processes. DNA damage is therefore most likely driven by "dissociative electron attachment" (DEA). DEA is a rather complicated process to model due to the coupling of electronic and nuclear degrees of freedom in the molecule. At the California State University Fullerton, we are currently commissioning a new spectrometer to study dissociation channels, reaction rates and orientation effects in DEA collisions between slow electrons and nucleotide molecules. At the meeting we will present design parameters and commissioning data for this new apparatus. -/abstract- [1] Boudiffa et al., Science, 8

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