

Abstract Submitted
for the DAMOP06 Meeting of
The American Physical Society

Towards cross sections for positrons scattered by uracil molecules¹ E. SURDUTOVICH, W.E. KAUPPILA, E.G. MILLER, T.S. STEIN, Wayne State University — We report measurements of relative total and positronium (Ps) formation cross sections as well as results from using the Ps annihilation ratio spectroscopy (PsARS) method [1] for low energy ($< 30\text{eV}$) positrons (e^+ s) scattered by uracil (an RNA nucleobase) molecules. In our experiments, e^+ beam passes through the scattering cell with heated uracil powder. These measurements are the first step in an experimental study of positron interactions with biological molecules. The interest in e^+ interactions with such molecules is boosted by possible relevance to positron emission tomography (PET), an important diagnostic tool in medicine. It has been recognized that Ps formation is a “subtle aspect of PET” [2] and it has been found that the Ps yield in water and organic solvents ranges from 38 to 70% [3]. A study of e^+ scattering on uracil molecules is a beginning in a detailed study of a variety of possible interactions of e^+ s with a live organism. Our preliminary results indicate large relative importance of Ps formation compared with other scattering channels at energies close to the threshold of Ps formation. [1]W.E. Kauppila et al., Phys. Rev. Lett. 93, 113401 (2004). [2]M.D. Harpen, Med. Phys. 31 (1), 57-61 (2004). [3]P. Castellaz et al., J. Nucl. Radiochem. Sci. 3, R1-R7 (2002).

¹Research supported by NSF Grant PHY 99-88093.

Eugene Surdutovich
Wayne State University

Date submitted: 27 Jan 2006

Electronic form version 1.4