Abstract Submitted
for the DAMOP09 Meeting of
The American Physical Society

Monte Carlo simulation of thermalziation of positronium in helium and water vapour SRDJAN MARJANOVIC, ZORAN PETROVIC, Institute of Physics Belgrade — Thermalization of positronium in helium and water vapour is modeled by a Monte Carlo simulation. Recently, positron transport was modeled by modern Monte Carlo codes since the data for binary collisions became available. Those studies are the basis for calculations for distributions of emitted gamma rays in living tissue and materials that are subject to positron emission diagnostics. Similar collisional data would be needed to follow the positronium which is formed in the last stage of positron interaction with gases and liquids. Measurements of positrinium thermalization yielded data that were analyzed to produce the scattering cross sections in helium [1] by using energy Balance equations with an assumption of Maxwell Boltzmann distribution (MBD) function for positronium. We have used a Monte Carlo code and tested cross sections without any assumptions for the energy distribution function. The thermalization of the initial distribution is rapid which supports the choice of MBD. Spatial ranges of penetration as well as diffusion coefficients were also determined. Similar calculations were made for water vapour based on the cross sections presented in [2]. [1] J J Engbrecht et al. Phys. Rev. A 77, 012711 (2008) [2] F A Gianturco et al. Phys. Rev. A 64 032715 (2001)

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Date submitted: 23 Jan 2009 Electronic form version 1.4