

Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

Positron transport and thermalization in low pressure molecular gases A. BANKOVIĆ, Z.LJ. PETROVIĆ, M. ŠUVAKOV, S. DUJKO, G. MALOVIĆ, Institute of Physics, Belgrade, Serbia, J.P. MARLER, University of Aarhus, Denmark, R.D. WHITE, James Cook University Townsville Australia — We present calculations of transport coefficients and thermalization times for positrons in H_2 , N_2 and CF_4 that are relevant for modeling of the Surko trap and aid in the interpretation of transport and annihilation experiments in low pressure gases. Recently it became possible to compile comprehensive cross section sets for these gases. The key novelty as compared to electron transport is the effect of positronium formation which changes the number of particles and has a strong energy dependence. This coupled with spatial separation by energy of the positron swarms leads to counter intuitive behaviour of some of the transport coefficients which may explain experimental observations in buffer gas traps. The relative magnitude of positronium formation to electronic excitations and the relative positions of their thresholds control both non-conservative transport phenomena and the efficiency of thermalization. The effect of vibrational excitation on low energy positrons is also considered.

Joan Marler
University of Aarhus

Date submitted: 28 Jan 2008

Electronic form version 1.4