Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Numerical study of Penning-Malmberg-Surko positron trap efficiency SRDJAN MARJANOVIC, MILOVAN SUVAKOV, ANA BANKOVIC, ZORAN LJ. PETROVIC, Institute of Physics, Pregrevica 118, POB 68, 11000 Belgrade
— Efficiency of a gas filled positron trap can be improved in two ways: by shortening the operation time required to thermalize the particles in the trap, and by increasing the percentage of particles trapped. We examine both techniques by a well tested Monte Carlo code, and give an overview of the loss processes involved. Temporal and spatial evolution of the energy distribution of particles allows us to show gradual transition of a beam into a swarm of particles. The model trap is a classic three stage potential well design using N_2 as a buffer gas in the first two stages and a N_2/CF_4 mixture in the third. It was found that including cross sections for rotational e^+-N_2 excitation is essential to achieve final stages of thermalization. Various trap implementations use different sources and moderators, and depending on the properties of the incoming beam, the trap itself can be optimized by changing its attributes (buffer gas pressures, dimensions of the chamber, electric potential shape, duration of different operation stages, etc.)

Zoran Petrovic
Institute of Physics, Pregrevica 118, POB 68, 11000 Belgrade

Date submitted: 04 Feb 2011 Electronic form version 1.4