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Numerical modeling of buffer gas positron traps SRDJAN MARJANOVIC, MILOVAN SUVAKOV, ZORAN LJ. PETROVIC, Institute of Physics, University of Belgrade, Pregrevica 118, POB 68, 11000 Belgrade — Buffer gas positron traps are the prime tool for study of low energy antimatter matter interaction. Our Monte Carlo based model includes all three stages of trap operation, loading, cooling and dumping, allowing us to examine the properties of exiting beam. At the same time we can study the processes inside the trap, that govern its efficiency in number of trapped particles, energy resolution and operation time. 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. Temporal and spatial evolution of the energy distribution of particles allows us to show gradual transition of a beam into a swarm of particles. We will give an overview of various loss processes inside and offer ways to mitigate the loss. 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.).

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