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A CF_4 based positron trap SRDJAN MARJANOVIC, ANA BANKOVIC, SASA DUJKO, Institute of Physics, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia, ADAM DELLER, BEN COOPER, DAVID CASSIDY, Department of Physics and Astronomy, University College London, Gower Street, London WC1E 6BT, United Kingdom, ZORAN PETROVIC[1], Institute of Physics, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia — All positron buffer gas traps in use rely on N_2 as the primary trapping gas due to its conveniently placed $a^1\Pi$ electronic excitation cross section that is large enough to compete with positronium (Ps) formation in the threshold region. Its energy loss of 8.5 eV is sufficient to capture positrons into a potential well upon a single collision. The competing Ps formation, however, limits the efficiency of the two stage trap to 25 %. As positron moderators produce beams with energies of several eV we have proposed to use CF_4 in the first stage of the trap, due to its large vibrational excitation cross section, where several vibrational excitations would be sufficient to trap the positrons with small losses. Apart from the simulations we also report the results of attempts to apply this approach to an existing Surko-type positron trap. Operating the unmodified trap as a CF_4 based device proved to be unsuccessful, due primarily to excessive scattering due to high CF_4 pressure in the first stage. However, the performance was consistent with subsequent simulations using the real system parameters. This agreement indicates that an efficient CF_4 based scheme may be realized in an appropriately designed trap.

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