Abstract Submitted
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A Buffer-Gas Trap for the NEPOMUC High-Intensity Low-Energy Positron Beam[1] A. DELLER, M. R. STONEKING, T. SUNN PEDERSEN, E. V. STENSON, J. HORN-STANJA, U. HERGENHAHN, S. NIL, A. CARD, Max Planck Institute for Plasma Physics, C. HUGENSCHMIDT, M. SINGER, Technical University of Munich, J. DANIELSON, C. M. SURKO, University California, San Diego, H. SAITOH, University of Tokyo, APEX COLLABORATION — The APEX collaboration aims to produce a neutral pair plasma, comprised of equal quantities of electrons and positrons, confined by the magnetic field of a levitated dipole. More than 10^{10} positrons are needed to achieve a short-Debye-length plasma with a volume of 10 litres and a temperature of ~ 1 eV, which necessitates new advances in positron accumulation. Buffer-gas positron traps have dramatically extended the scope for atomic and non-neutral plasma physics experiments involving antimatter. In these devices, a continuous beam of positrons enters a Penning-Malmberg trap, wherein inelastic collisions with low-density molecular gases promote the efficient capture of the antiparticles. We present our plans for the installation of a buffer-gas trap at the NEPOMUC neutron-induced positron source in Munich. Beyond the pair plasma experiments, an intense trap-based positron beam will also facilitate new applications, for example, the background-free measurement of positron-annihilation-induced Auger-electron spectra.

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