



Contribution ID: 222

Type: **Poster**

## A buffer-gas trap for the NEPOMUC high-intensity low-energy positron beam

*Wednesday, 9 December 2020 17:40 (20 minutes)*

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  $\sim 1$ -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.

**Primary authors:** DELLER, Adam (IPP); STONEKING, Matthew (Max Planck Institute for Plasma Physics); PEDERSEN, Thomas Sunn (Max-Planck-Institut für Plasmaphysik); STENSON, E. V.; Dr HORN-STANJA, Juliane (IPP); HERGENHAHN, Uwe (Max-Planck-Institut für Plasmaphysik); Mr NISSEL, Stefan (IPP); CARD, Alexander (Max-Planck-Institut für Plasmaphysik); HUGENSCHMIDT, Christoph; SINGER, Markus; Dr DANIELSON, James R. (UCSD); Prof. SURKO, Clifford M. (UCSD); Mr SAITOH, Haruhiko (University of Tokyo)

**Presenter:** DELLER, Adam (IPP)

**Session Classification:** Joint poster session of MLZ User Meeting and DN2020

**Track Classification:** UM: Nuclear, Particle, and Astrophysics