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Progress toward the creation of magnetically confined pair plasmas — •Haruhiko Saitoh[1,6], Uwe Hergenhahn[1], Holger Niemann[1,2], Norbert Paschkowski[1], Thomas Sunn Pedersen[1,2], Juliane Stanja[1], Eve V. Stenson[1], Matthew R. Stoneking[1,3], Christoph Hugenschmidt[4], Christian Piochacz[4], Sebastian Vohburger[4], Lutz Schweikhard[2], James R. Danielson[5], and Clifford M. Surko[5] — [1]Max-Planck-Institut für Plasmaphysik — [2]Ernst-Moritz-Arndt-Universität Greifswald — [3]Lawrence University — [4]Technische Universität München — [5]University of California, San Diego — [6]The University of Tokyo

The PAX (Positron Accumulation eXperiment) and APEX (A Positron Electron eXperiment) projects aim to experimentally study the unique wave propagation and stability properties of pair plasmas. We plan to accumulate a large number of positrons in a multicell-type trap system (PAX) and to confine them with electrons in APEX, a levitated dipole or stellarator configuration, operated at the NEPOMUC facility, the world's most intense positron source. In this contribution, we report on recent results from PAX and APEX. We have conducted electron experiments with a 2.3 T Penning-Malmberg trap; confinement for more than 1 hour and observation of a collective mode were demonstrated. At NEPOMUC, we have characterized the positron beam for a wide energy range. In a prototype permanent-magnet dipole trap, efficient (38%) injection of the remoderated 5 eV positron beam was realized using ExB drifts. Based on these results, design studies on the confinement of pair-plasmas in a levitated dipole trap are ongoing.

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