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Intense positron beam as a source for production of electron-positron plasma M.R. STONEKING, Lawrence University, J. HORN-STANJA, E.V. STENSON, T. SUNN PEDERSEN, H. SAITOH, U. HERGENHAHN, H. NIEMANN, N. PASCHKOWSKI, Max Planck Institute for Plasma Physics, C. HUGENSCHMIDT, C. PIOCHACZ, Technische Universitt Mnchen — We aim to produce magnetically confined, short Debye length electron-positron plasma and test predicted properties for such systems. A first challenge is obtaining large numbers of positrons; a table-top experiment (system size ˜5 cm) with a temperature less than 5 eV requires about 10^{10} positrons to have more than 10 Debye lengths in the system. The NEPOMUC facility at the FRM II research reactor in Germany is one of the world's most intense positron sources. We report on characterization (using a retarding field energy analyzer with magnetic field gradient) of the NEPOMUC beam as delivered to the open beam port at various beam energies and in both the re-moderated and primary beam configurations in order to design optimal trapping (and accumulation) schemes for production of electron-positron plasma. The intensity of the re-moderated (primary) beam is in the range 2 -3 x 10^7 /s (1 – 5 x 10^8 /s). The re-moderated beam is currently the most promising for direct injection and confinement experiments; it has a parallel energy spread of 15 – 35% and the transverse energy spread is 6 – 15% of the parallel energy. We report on the implications for injection and trapping in a dipole magnetic field as well as plans for beam development, *in situ* re-moderation, and accumulation. We also report results demonstrating a difference in phosphor luminescent response to low energy positrons versus electrons.

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