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Warp simulations of non-neutral plasmas in traps with nonuniform magnetic fields[1] KATIA GOMBEROFF, JONATHAN WURTELE, Center for Beam Physics, Lawrence Berkeley National Laboratory and Department of Physics, UC Berkeley — The three-dimensional particle-in-cell simulation Warp [1] is used to study a variety of nonneutral plasma systems. The equilibrium density in a trap with a spatially varying axial field is studied. Numerical results indicate that, as anticipated, equilibrium is reached along field lines. Plasma confinement and equilibrium when combined multipole fields added to a conventional Penning-Malmberg trap, as is being done in antihydrogen experiments, is investigated—some preliminary results indicate that in some cases high density regions are produced which may be caused by potential variations along field lines. Such variation is expected and demonstrated in the case of a trap with a mirror [2]. Numerical and computational issues associated with this modeling are discussed. [1] D. P. Grote, A. Friedman, I. Haber, J-L Vay, 2004 ECRIS Workshop, AIP Conf. Proc. **749**, 55, (2005). [2] K. Gomberoff, J. Fajans, J. Wurtele, A. Friedman, D. P. Grote and R. H. Cohen, "Simulation studies of non-neutral plasma equilibria in an electrostatic trap with a magnetic mirror," in preparation (2006).

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