

Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Calculation of the “Rotating Wall” Torque Near a Fixed Point Attractor.¹ T.M. O’NEIL, M.W. ANDERSON, UCSD — A rotating field asymmetry (the so-called “rotating wall”) is often used to exert a torque on a non-neutral plasma in a Penning trap, spinning the plasma up to high rotation frequency (and high density). In recent experiments, the plasma state was observed to converge to an attracting fixed point where the applied torque balanced ambient torques.² At the fixed point, the nearly uniform plasma rotation frequency differs only slightly from the frequency of the rotating field asymmetry. This paper explains the attractor, using simple dynamical equations for the uniform plasma rotation frequency and temperature.³ Also, the paper calculates the torque due to the rotating field asymmetry near the attractor, that is, for small frequency difference. The calculated torque is consistent with the measured torque.

¹Supported by NSF PHY-0354979.

²J.R. Danielson and C.M. Surko, Phys. Rev. Lett. **95**, 035001 (2005); also see invited talk by Danielson at this conference.

³T.M. O’Neil and D.H.E. Dubin, Phys. Plasmas **5**, 2163 (1998).

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Date submitted: 22 Jul 2005

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