Division of Plasma Physics
November 16–20, 1992, Seattle, WA

Category Number and Subject 1.2 Nonneutral Plasmas ☐ **Theory** ☒ **Experiment**

Improvement of Test Particle Confinement by Application of Electrostatic Fields*, D.L. Eggleston, Occidental College - The confinement time τ of non-neutral plasma traps is believed to be limited by the presence of non-axisymmetric fields. Currently, τ is improved by the application of small magnetic fields perpendicular to the main axial field. These fields remove (cancel) some of the asymmetries (e.g. the earth's magnetic field). We are exploring the further improvement of τ through the application of electrostatic fields. The fields are applied by biasing the 40 wall sectors (5 axial divisions $\times$ 8 azimuthal divisions) of our confinement region. The bias voltages are set by 40 computer-controlled 12-bit D/A converters. This arrangement gives unprecedented control over the applied electrostatic fields, but also presents a huge parameter space to explore. To date we have taken two approaches to this task. 1) We have applied sector voltages which approximate a single Fourier mode (i.e. that produce a field that varies mainly like $\mathrm{Cos}(kz)\cdot\mathrm{Cos}(l\theta)$). None of these cases have significantly improved confinement. 2) We have applied voltages to just one or two of the sectors. Our best case so far using this approach gives a 40% improvement in τ.
*Supported by ONR N00014-89-J-1399.

☒ Prefer Poster Session
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same session as Malmberg/ O'Neil group posters

☐ Special Facilities Requested (e.g., movie projector)

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Submitted by:

(Signature of APS Member)

Dennis L. Eggleston
(Same Name Typewritten)

Occidental College/Physics
Los Angeles, CA 90041
(Address)

This form plus **TWO XEROX COPIES** must be received by Friday, July 10, 1992 at the following address:

Saralyn Stewart
The University of Texas at Austin
Institute for Fusion Studies
26th & Speedway - RLM 11.217
Austin, TX 78712
Tel: (512) 471-4378