

**35th Annual Meeting, APS Division of Plasma Physics  
1-5 November 1993—St. Louis, MO**

**ABSTRACT SUBMITTAL FORM**

Subject Classification Category      1.2 Non-neutral Plasmas    ☐ Theory    ☒ Experiment

Experiments on Electron Vortex Dynamics in an Applied Shear Flow\*, D.L. Eggleston, P. Buyyala, and J. Benavidez, Occidental College -- We are using the Occidental non-neutral plasma trap to study 2-D vortex dynamics in an applied shear flow. An  $E \times B$  shear flow is produced by a biased wire which runs along the axis of the confinement cylinder. An electron column (vortex) is injected off-axis with variable position and density (vorticity). When the wire bias is negative, the applied shear opposes the rotational velocity of the vortex. If this shear exceeds a critical value, the vortex develops filamentary arms which wrap around the wire and eventually disperse the vortex. The critical shear value depends linearly on the electron density, as expected from theory. When the applied shear velocity is reversed (by applying a positive wire bias), the vortex is not dispersed even for our highest values of shear. Rather, the vortex orbits around the wire for as long as we can observe it (more than 1000 orbits). For large times, however, the azimuthal position of these shear-stable vortices is chaotic (i.e. fluctuates from shot to shot) indicating the presence of another dynamical instability.

\*Supported by ONR N00014-89-J-1399.

☒ Prefer Poster Session

☐ Prefer Oral Session

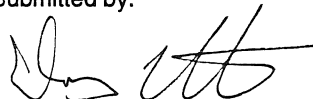
☒ This poster/oral should be placed in the following grouping: (specify order)

Non-neutral plasma session  
with UCSD group

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

☐ Other Special Requests

Submitted by:



(Signature of APS Member)

Dennis L. Eggleston

(Same Name Typewritten)

Occidental College/Physics  
Los Angeles, CA 90041

(Address)

**This form, or a computer generated form, plus TWO XEROX COPIES, must be received by Friday, 2 July 1993, at the following address:**

**Saralyn Stewart  
The University of Texas at Austin/Institute for Fusion Studies  
26th and Speedway—RLM 11.234  
Austin, TX 78712  
Telephone (512) 471-4378**