

Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

The formation of vortex rings from elliptical nozzles CLARA O'FARRELL, ROBERT WHITTLESEY, JOHN O. DABIRI, California Institute of Technology — It is known that there is a physical limit to the size of an axisymmetric vortex ring beyond which it rejects further vorticity flux, and a trailing jet forms behind it.¹ This transition, termed “vortex pinch-off,” is predicted by an energy-maximization argument due to Kelvin and Benjamin.² However, the Kelvin-Benjamin principle does not apply to non-axisymmetric flows, and the dynamics of the formation of non-axisymmetric vortex rings remain largely unknown. We consider the formation of vortex rings from elliptical nozzles, and compare it to that of axisymmetric vortex rings. By performing PIV on several planes along the perimeter of the elliptical nozzle, we study the effect of varying curvature on vortex formation.

¹Gharib *et al.*, *J. Fluid Mech.*, **360**, p. 121, 1998.

²Benjamin, In *Applications of Methods of Functional Analysis to Problems in Mechanics*, Springer, 1976.

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Date submitted: 05 Aug 2011

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