

Abstract Submitted  
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**Evidence of New Plasma Equilibrium State Sought** WILLIAM EDWARDS, ERIC HELD, AJAY SINGH, JEREMY BISHOP, Utah State University — A recently reported plasma equilibrium state, derived by minimizing the total system energy without imposing the quasi neutrality condition [1], offers a new possibility for designing a magnetic confinement device for thermonuclear fusion. Utah State University has acquired a small tokamak from the University of Saskatchewan in Canada. This machine is being modified in an attempt to experimentally verify the existence of the state and to determine a procedure whereby a gas at room temperature can be heated to thermonuclear fusion temperatures while held in the new state by magnetic and electrostatic fields. Conditions on size of vessel, gas fill pressure, magnetic field magnitudes, and plasma beta are restricted. A fusion device will be compact leading to the possibility of applications such as production of neutron beams for examination of luggage in airports, search for unexploded land mines, cancer diagnosis, activation of thorium for fission energy, etc.

**Reference**

[1] W. F. Edwards and E. D. Held, *Phys ,Rev. Lett.*, **11**, 255001 (2004)

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