Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

A new high beta plasma device at UCLA[1] CHRIS COOPER, WALTER GEKELMAN, PATRICK PRIBYL, STEFANIE STATTEL, Dept. Physics, UCLA, KIMBERLY DEROSE, Dept. Physics, Harvard, TROY CARTER, Dept. Physics, UCLA — We recently made a high beta plasma 30 eV and 100G $<$ Bφ $<$ 250G) on the axis of a toroidal device at UCLA. The highest beta attained, $\beta \approx 3$, was at the lower field. The vacuum chamber is 30 meters in circumference, 2 meters wide and 3 meters tall. Using a weak vertical field, the 20 cm diameter plasma has made 4 rotations for a length of 120 m. Interestingly, at these plasma parameters the neutral penetration depth is shorter than the radius of the plasma, so we expect the plasma is fully ionized. The cathode used is amorphous Lanthanum Hexaboride (LaB_6), which has more than 10 times the emission per area of the Barium Oxide cathode now used in the LAPD. Also LaB_6 cathodes can be run in a hydrogen plasma and are relatively insensitive to oxygen leaks. We have developed a technique to make reliable large cathodes, the one in use is 400 cm^2. The magnetic field is steady state and the plasma is pulsed at 1 Hz with pulse lengths as long as 120 ms. The plasma is hundreds of parallel Alfvén wavelengths long with a Lundquist number of 5000. Some experiments possible on this device are: fully three dimensional magnetic field line reconnection, Alfvénic and MHD turbulence, studies of rotational transforms, physics of Alfvén waves at high beta in Toroidal geometries, and high beta laser-plasma interactions.

[1]Work supported by the Dept. of Energy and the National Science Foundation.

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Date submitted: 15 Jul 2008 Electronic form version 1.4