Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

High-beta effects in a helicon plasma ROD BOSWELL, CORMAC CORR, Australian National University, SPACE PLASMA POWER AND PROPULSION TEAM — Above an input power of 900 W and a magnetic field of 30 G in WOMBAT, a 150 cm long 80 cm diameter chamber, a narrow column of bright blue Ar II light with a diameter of $\sim$ 6 cm is observed along the axis of the diffusion chamber. Although the axial plasma density is very uniform, the radial profiles are not, suggesting that a large diamagnetic current might be induced. This has been investigated by measuring the temporal evolution of the magnetic field (B_z) and the plasma kinetic pressure in a pulsed discharge mode. Although the electron pressure can exceed the magnetic field pressure by a factor of 2, a complete expulsion of the magnetic field from the plasma interior is not observed. The magnetic field displays the strongest change at the plasma centre, which corresponds to the maximum in the plasma kinetic pressure. These results can be explained by taking into account the penetration of the magnetic field into the plasma which is faster than the plasma formation time resulting in only a slight perturbation of the magnetic field in the continuous plasma.

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Date submitted: 16 Jul 2007 Electronic form version 1.4