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**Studies of a plasma with a hot dense core in LAPD** BART VAN COMPERNOLLE, WALTER GEKELMAN, PATRICK PRIBYL, CHRIS COOPER, UCLA — Recently, considerable effort in the LArge Plasma Device at UCLA (LAPD) has gone into the study of large cathodes which would enable higher discharge currents and higher densities. The new cathode is made out of Lanthanum HexaBoride (LaB6). LaB6 has a low work function and has higher emissivity than Barium oxide coated cathodes. The operating temperature of LaB6 cathodes lies above 1600 degrees Celsius. Tests of this cathode in the Enormous Toroidal Plasma Device (ETPD) showed that densities in excess of  $2 \cdot 10^{13} \text{cm}^{-3}$  and electron temperatures of 12 eV are feasible. Small LaB6 cathodes (3mm - 2cm) have been used before in LAPD in several experiments on heat transport and on magnetized flux ropes. The cathode presented in this paper has a 8 cm diameter, and can be positioned at different radial locations. The cathode will be pulsed into the standard background plasma ( $n_e = 2 \cdot 10^{12} \text{cm}^{-3}$ ,  $.25 \leq T_e \leq 6 \text{ eV}$ , dia = 60 cm, L = 18 m) creating a plasma with a hot dense core. We present the characterization of the core plasma at different conditions. Studies of the heat transport and density spreading at the interface between the core plasma and background plasma will be done by use of a variety of probes (Langmuir, magnetic, Mach, emissive) as well as fast photography.

Bart Van Compernelle  
UCLA

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