Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Stellarator Research at Columbia University F.A. VOLPE, C. CALIRI, A.W. CLARK, A. FEBRE, K.C. HAMMOND, S.D. MASSIDDA, R.M. SWEENEY, Columbia University, T.S. PEDERSEN, X. SARASOLA, IPP Greifswald, D.A. SPONG, ORNL, Y. KORNBLUTH, Yeshiva University — Neutral plasmas were formed and heated by Electron Cyclotron and Electron Bernstein Waves at 2.45 GHz in the Columbia Nonneutral Torus (CNT) and were characterized with Langmuir probe and fast camera measurements. Future research will take advantage of the low aspect ratio (A=2.3-2.7), high fraction of trapped particles and large vessel of CNT. The first plasma was obtained in a prototype circular coil tokamak-stellarator hybrid (Proto-CIRCUS). As a result of the toroidal-field coils being tilted and interlinked with each other, the device can be operated at lower plasma-current than a tokamak of comparable size and field, with implications for disruptions and steady state. Additionally, the toroidal magnetic ripple is less pronounced. Comparisons between field-line calculations and experimental mapping is expected to confirm the generation of rotational transform and its dependence on the radial location and tilt of the coils, both of which can be varied. Finally we propose a small EC-heated classical stellarator to improve the production-rate and charge-state of ions in EC-resonant ion sources (ECRIS) over the conventional magnetic-mirror design, and discuss how ions would be extracted, for injection in research and medical accelerators.

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Date submitted: 12 Jul 2013 Electronic form version 1.4