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Neutral Beam Injection System for the C-2W Field Reversed Configuration Experiment

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C-2U Field-Reversed Configuration (FRC) experiment proved substantial reduction in turbulence-driven losses via tangential neutral beam injection (NBI) coupled with electrically biased plasma guns at the plasma ends. [1, 2] Highly reproducible FRCs with a significant fast-ion population [3] and total plasma temperature of ~ 1 keV were produced and sustained for times significantly longer (more than 5 ms) than all characteristic plasma decay times without beams. [4]

Last year, the C-2U experimental device underwent a major upgrade in order to further improve the FRC sustainment and demonstrate the FRC ramp-up. The new C-2W machine is equipped with a new NBI system producing a record total hydrogen beam power of 13+ MW in a 30 ms pulse. The NBI system consists of eight positive-ion based injectors featuring flexible, modular design based on a triode ion optical system with slitted multi-aperture inertially cooled grids and ballistic beam focusing. The cold-cathode arc discharge plasma sources [5] generate up to 180 Amps of extracted ion current.

This presentation provides an overview of the C-2W NBI system, including the design of the injectors, layout of the power supply system, and first experimental results.

References

- [1] M. Tuszewski et. al, Phys. Rev. Lett 108, 255008 (2012).
- [2] H.Y. Guo et. al., Nature Comm 6, 6897 (2015).
- [3] M.W. Binderbauer et. al., Phys. Plasmas 22, 056110 (2015).
- [4] M.W. Binderbauer et. al., AIP Conf. Proc. 1721, 030003-1 –030003-11 (2016).
- [5] A.A. Ivanov et. al, Rev. Sci. Instrum. 79, 02C103 (2008).

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