

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Neutral beam system for the C-2-Upgrade Field Reversed Configuration Experiment SERGEY KOREPANOV, ARTEM SMIRNOV, RYAN CLARY, ALEXANDR DUNAEVSKY, IVAN ISAKOV, RICHARD MAGEE, VASILY MATVIENKO, ALAN VAN DRIE, Tri Alpha Energy, PETR DEICHULI, ALEXANDR IVANOV, KONSTANTIN PIROGOV, ALEKSEY SOROKIN, NICKOLAY STUPISHIN, ROMAN VAKHRUSHEV, Budker Institute of Nuclear Physics, TAE TEAM, BUDKER TEAM — In the C-2 field-reversed configuration (FRC) experiment, tangential neutral beam injection (NBI), coupled with electrically-biased plasma guns at the plasma ends and advanced surface conditioning, led to dramatic reductions in turbulence-driven losses [1]. Under such conditions, highly reproducible, macroscopically stable, hot FRCs with a significant fast-ion population, total plasma temperature of ~ 1 keV and record lifetimes were achieved [2]. To further improve the FRC sustainment and provide a better coupling with beams, the C-2 device has been upgraded with a new NBI system, which can deliver up to a total of 10 MW of hydrogen beam power (15 keV, 8 ms pulse), by far the largest ever used in compact toroid plasma experiments. The NBI system consists of six positive-ion based injectors featuring flexible, modular design. This presentation will provide an overview of the C-2U NBI system, including: 1) NBI test facility, beam characterization, and acceptance tests, 2) integration with the machine and operating experience, 3) improvements in plasma performance with increased beam power.

[1] M. Tuszewski et. al, Phys. Rev. Lett 108, 255008 (2012).

[2] M.W. Binderbauer et al., Phys. Plasmas 22, 056110 (2015).

Sergey Korepanov
Tri Alpha Energy

Date submitted: 24 Jul 2015

Electronic form version 1.4