

## Magnetic Diagnostic Suite and Initial Data from Translating CTs in C-2W

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Commissioning and early operations are underway on C-2W, Tri Alpha Energy's new Enhanced Beam-Driven Field-Reversed Configuration (EBD FRC) experiment. The increased complexity level of this machine requires an equally enhanced diagnostic capability. A fundamental component of any magnetically confined fusion experiment is a firm understanding of the magnetic field itself. C-2W is outfitted with over 700 magnetic field probes; ~550 internal and ~150 external. Innovative in-vacuum annular flux loop / B-dot combination probes provide/infer information about plasma shape, size, pressure, energy, total temperature, and trapped flux when coupled with established theoretical interpretations. The massive Mirnov array, consisting of eight rings of eight 3D probes, provides detailed information about plasma motion, stability, and MHD modal content with the aid of singular value decomposition (SVD) analysis. Internal Rogowski probes detect the presence of axial currents flowing in the plasma jet in multiple axial locations. The initial startup phase of C-2W has already been very fruitful. Generation of our beam target FRC requires the formation and acceleration of two CTs that are collided and merged. We have already realized translation velocities over 380 km/s, which represents a greater than 1.6 times increase in initial kinetic energy over C-2/2U [1] plasmas. These values are expected to increase further as the system is fine-tuned.

Data from the magnetic diagnostic array will be presented along with a discussion of the plasma parameters derived from these measurements.

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