

Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Performance of the Ignitor Pellet Injector¹ A. FRATTOLILLO, S. MIGLIORI, S. PODDA, F. BOMBARDA, ENEA, Italy, L.R. BAYLOR, J.B.O. CAUGHMAN, S.K. COMBS, C. FOUST, D. FEHLING, J.M. MCJILL, S. MEITNER, ORNL, G. ROVETA, CRIOTEC Impianti, Italy — ENEA and ORNL have built a four barrel, two-stage pneumatic injector for the Ignitor experiment featuring two innovative concepts: (i) an optimal shaping of the propellant pressure pulse to improve pellet acceleration, and (ii) the use of fast closing (< 10 ms) valves to drastically reduce the expansion volumes of the propellant gas removal system. The injector is designed to deliver pellets of different sizes with velocities up to 4 km/s, capable of penetrating near the center of the plasma column when injected from the low field side in Ignitor burning plasmas ($n_0 \cong 10^{21} \text{m}^{-3}$, $T_0 \cong 11$ keV). The ENEA sub-system, which includes the two-stage guns and pulse-shaping valves, the gas removal system, with associated controls and diagnostics, and the ORNL sub-system, consisting of the cryostat and pellet diagnostics, with related control and data acquisition system, have been assembled in Oak Ridge. Pellet speeds of 2 km/s have been achieved, despite the unfavorable configuration adopted in order to carry out some preliminary tests immediately after assembling the system, a very promising result. A second experimental campaign is planned for the 2008 Fall, when all four diagnostic channels should be complete.

¹Sponsored in part by ENEA of Italy and by the U.S. D.O.E.

F. Bombarda
ENEA/MIT

Date submitted: 09 Jul 2008

Electronic form version 1.4