

Abstract Submitted
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The Ignitor High Speed Pellet Injector* F. BOMBARDA, S. MIGLIORI, A. FRATTOLILLO, ENEA, Italy, L.R. BAYLOR, J.B.O. CAUGHMAN, S.K. COMBS, D. FEHLING, C. FOUST, J.M. MCJILL, O.R.N.L., G. ROVETA, Criotec Impianti, Italy — A joint ENEA-Frascati and ORNL program for the development of a four barrel, two-stage pellet injector for the Ignitor experiment is in progress. At 4 km/s, pellets can penetrate close to the plasma center when injected from the low field side even for the plasma temperatures expected at ignition. Recent activities carried out at ORNL include improvements to the cryostat, the addition of miniature adjustable heaters in the the freezing zone, and of four close-coupled valves for rapid evacuation of gas after a shot. The LabView application software was successfully used to control the simultaneous formation of D₂ pellets, from 2.1 to 4.6 mm in diameter, that were launched at low speed. ORNL developed, specifically for this application, the light gate and microwave cavity mass detector diagnostics that provide in-flight measurements of the pellet mass and speed, together with its picture. The ENEA two-stage propelling system, now ready for shipping to ORNL, makes use of special pulse shaping valves, while fast valves prevent the propulsion gas from reaching the plasma chamber. Novel experiments, e.g. to create high pressure plasmas in existing devices using this innovative facility, have been envisioned and are being simulated.

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