IFE/P5-9

DEVELOPMENT OF SHELL INJECTION SYSTEM FOR THE FUTURE IFE POWER PLANT

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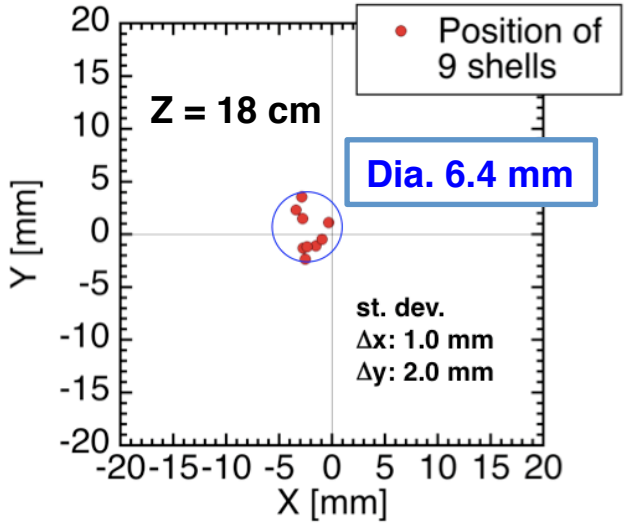
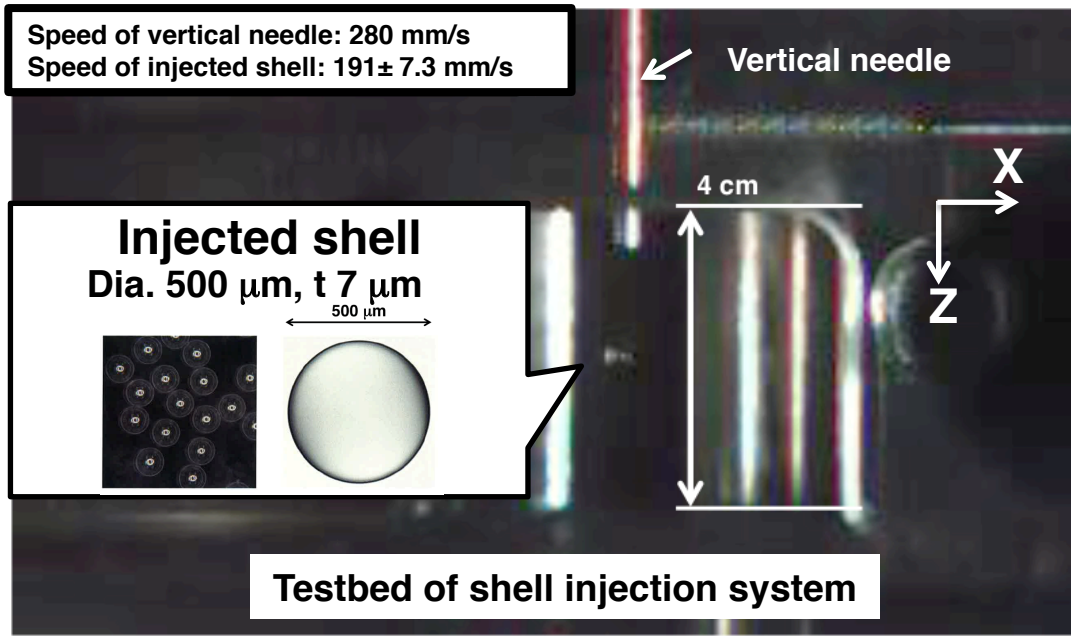
- **In a laser-driven inertial fusion energy (IFE) reactor, injected fuel pellets are continuously delivered into the reaction chamber and engaged by laser beams at 10's Hz.**
- **Using a repetitive, 100-fs ultra-intense laser, the engagement of 1-Hz-injected flying bead pellets involving beam fusion neutron reaction has been demonstrated [1,2].**
- **To demonstrate repetitive fuel implosion with 1 Hz laser system, a testbed of shell injection system delivering a spherical shell (diameter 500 μm and thickness 7 μm) has been developed.**
- **The testbed demonstrated that (i) repetitive: 0.5 Hz (max.) of shell injection was possible with the shell speed of 191 mm/sec, and (ii) distribution of injected shell after 18 cm free-fall was within 6.4 mm diameter circle. From the previous beads injection experiments, the estimated laser-hit-ratio is the level of 10%; this value would be acceptable as far as the first laser engagement experiment.**

Distributions of shells





[1] O. Komeda et al., Sci. Reports 3 (2013) 2561
[2] Y. Mori et al., Fusion Sci. & Technol. *accepted*