1Hz Pellets Injection and Laser Synchronous System for Continuous Laser Confinement Fusion and Neutron Generation

Primary author: Ryohei Hanayama(GPI, JAPAN)

We succeeded in injection of spherical deuterated polystyrene bead pellets at 1 Hz and symmetrical engagement and irradiation of them with two ultra-intense laser beams. (i) This is the first demonstration of ultra-intense laser engagement of injected flying pellets. The laser intensity was high enough to produce a DD neutron yield of $9.5 \times 10^4/4\pi$ sr/shot. (ii) We observed channel formation through the free-falling pellets, which might be the evidence to support a scheme for fast ignition.

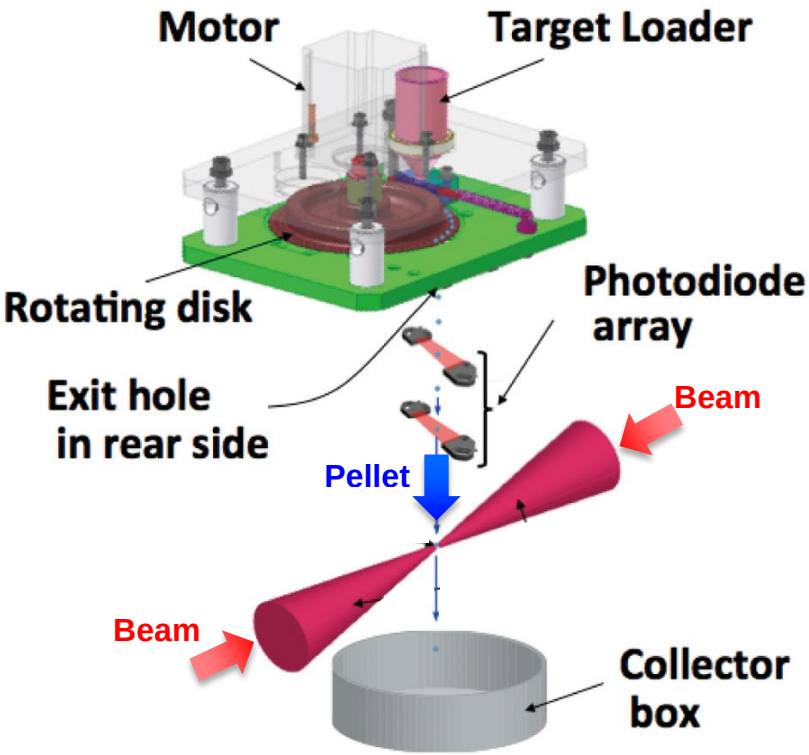
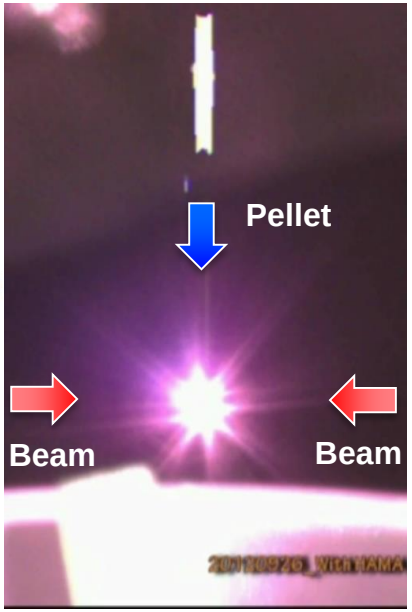


FIG.1 pellet injection and laser synchronous system



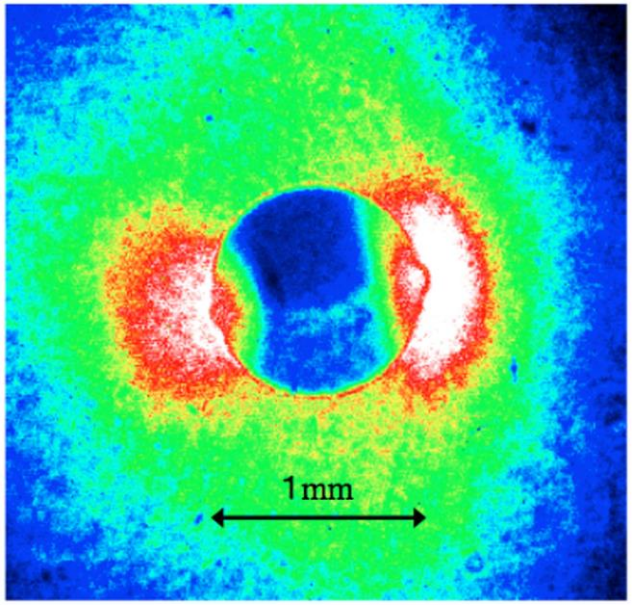


FIG.2 Snapshots of the instant of pellet engagement. (left) a visible image. (right) a shadowgraph using a synchronized 2ω harmonic laser probe.

The hit probability was about 70%.
And it has been improved to more than 90 % at the present moment.

FIG.3
A straight channel along the laser axis was shown inside the irradiated pellet.