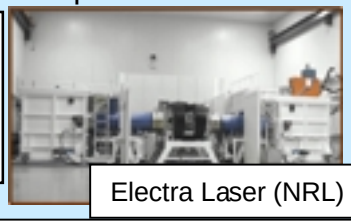
Recent Advances in the High Average Power Laser (HAPL) Program

March 30, 2002

An integrated research program to develop fusion energy with lasers and direct drive targets. Over 15 institutions contribute to this program. A few of the highlights from the past year are summarized here.

Krypton Fluoride Laser

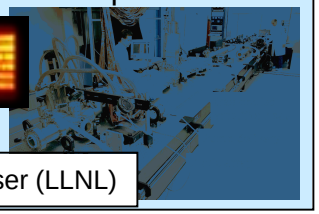
- First generation pulsed power system: 5 pulses per second for five hours, Makes 500,000 Volt electron beams.
- Theoretical modeling guided mitigation of electron beam instability.
- Demonstrated solid state laser triggered pulsed power switch.



Electra Laser (NRL)

Diode Pumped Solid State Laser (DPPSL)

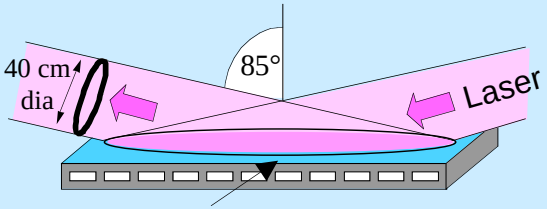
- Developed 160,000 Watt power laser diode arrays.
- Demonstrated gas cooling of laser
- Fabricated large, high quality crystals.
- Half of the system complete



Mercury Laser (LLNL)

Final Optics

Demonstrated concept for high laser damage threshold aluminum mirror.



Aluminum coating on cooled substrate

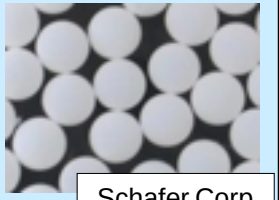
UC San Diego

Targets

General Atomics

Thin gold (Au) and/or palladium (Pd) coatings on spherical shells.

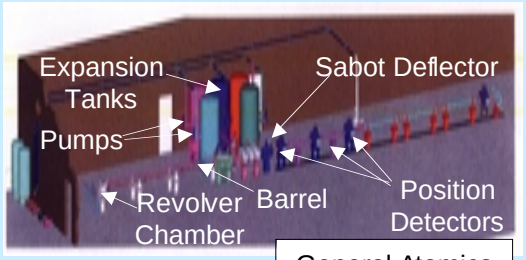
Established chemistry for low density foam shells



Schafer Corp

Target Injection

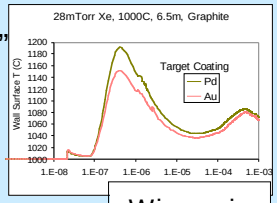
Begun fabrication of target injection and tracking system.



General Atomics

Chambers

"Operating window" for target injection, wall survival, and high efficiency.



Wisconsin

UC San Diego

Developing code to study chamber "clearing" between shots.