
Out-of-band Radiation
-
OOB Radiation Measurements

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CO₂ laser based 10W-EUV system

- ✓ Industrial RF-CO₂ lasers have been installed.
- ✓ Amplification characteristics (g_0 , E_s) have been investigated.
- ✓ Pedestal has been controlled.

- ✓ High speed Xe droplet is under development.
- ✓ High speed water droplet has been optimized.

Xenon Droplets

7kW (15ns, 70mJ, 100kHz)

Multiline CO₂
Short pulse osc.

RF-CO₂
pre-amp

RF-CO₂
pre-amp

RF-CO₂
main amp

>10W
@I/F

- ✓ Short pulse osc. has been developed.
- ✓ Multiline seeder is under development

- ✓ industrial Nd:YAG laser has been installed.
- ✓ Short pulse operation has been optimized.

Pre-pulse
Nd:YAG

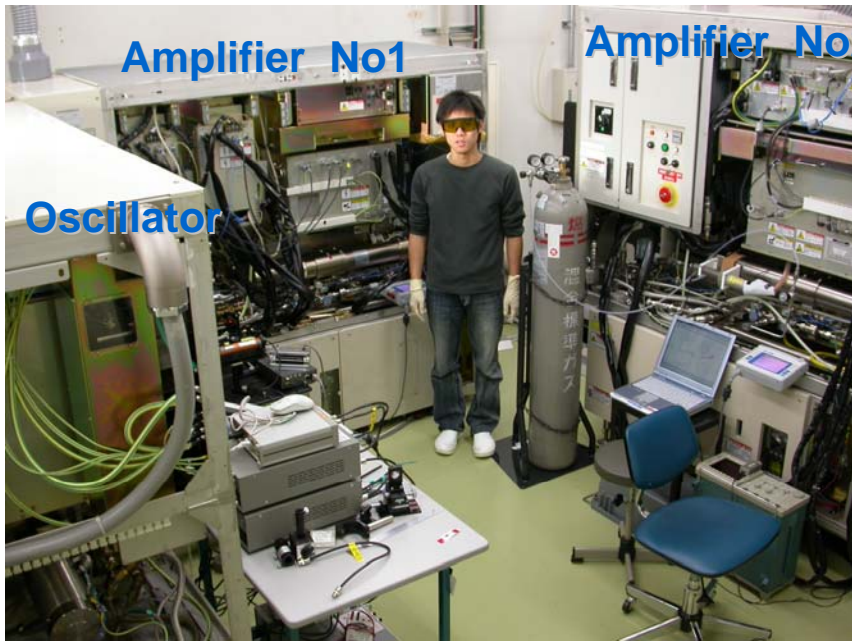
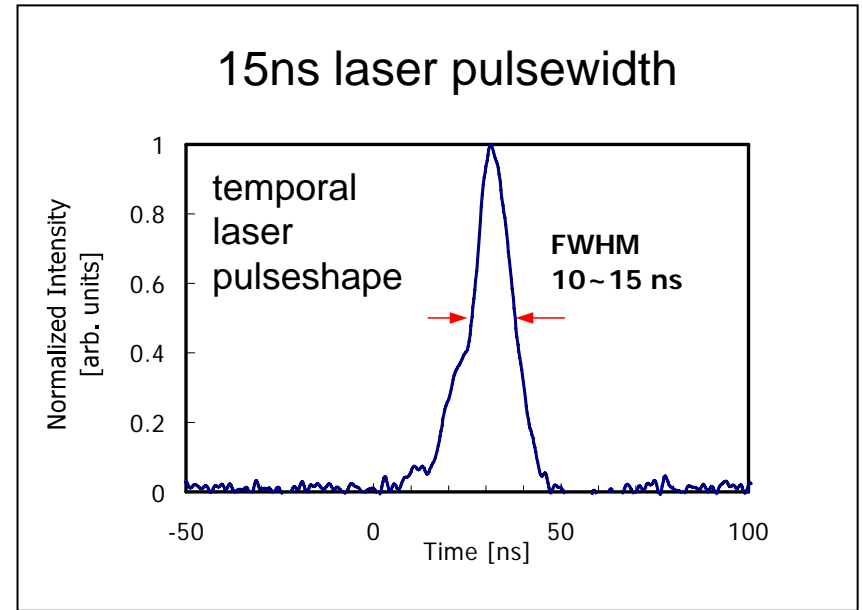
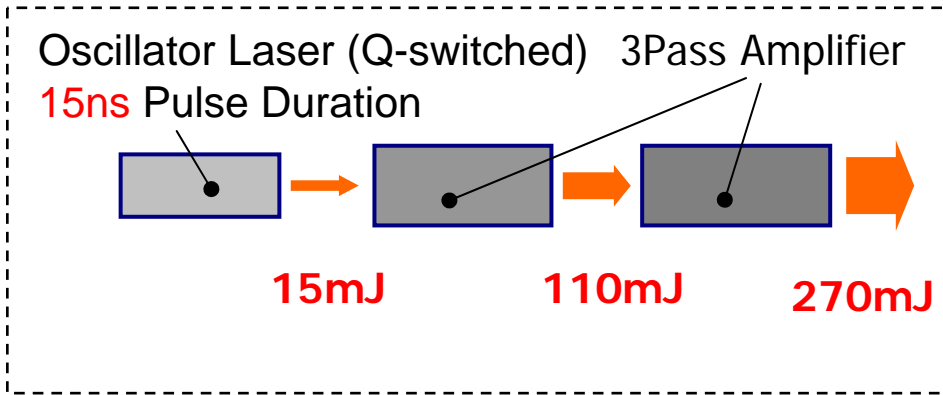
Magnetic field mitigation

- ✓ Effectiveness of magnetic field mitigation has been confirmed for pre-pulsed CO₂.



System operation : 1Q/2006

3-Stage MOPA TEA CO₂ Laser System Configuration



TEA-system based on excimer lasers from Gigaphoton:

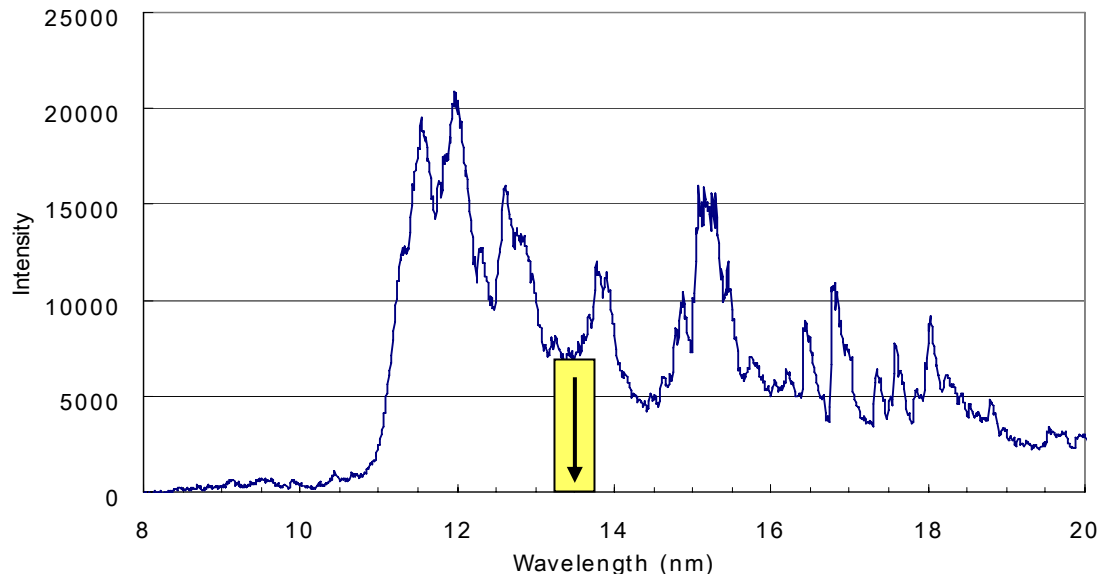
- OSC: Q-switched, 15mJ, 15ns
- AMP1: 3-pass amplification
- AMP2: 3-pass amplification

Total amplification: 18 times

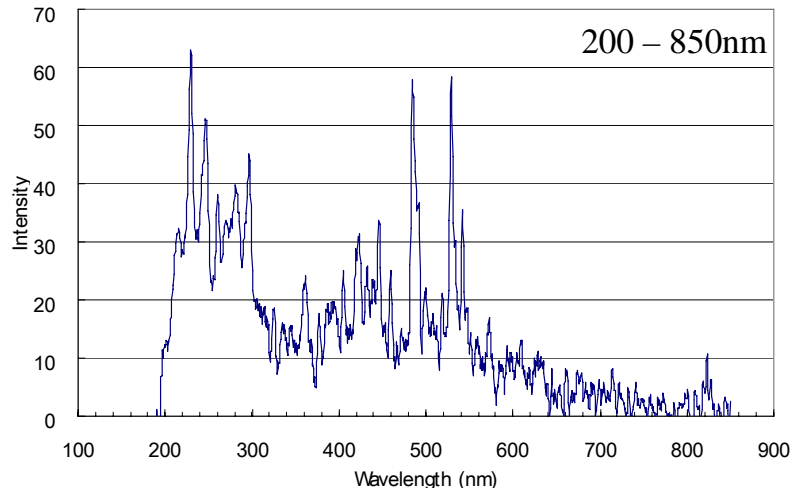
CE of 0.6% obtained with Xe-jet

EUV spectrum

- Currently setting up 7kW RF-CO2 laser system and EUV source, i.e. OOB-data not yet available; 10W EUV system operation 01/2006
- TEA-laser spectral data show that most OOB emission is evidently in the EUV region, between 8 and 20nm we observe about 20 times the 2% in-band EUV emission at 13.5nm



VIS spectrum



- In the VIS the plasma also emits but at a much lower degree, about 1% of EUV in-band emission