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V. Borisov, O. Khristoforov, Yu. Kirykhin, S. Kuznetsov, Yu. Stepanov, A.
Vinokhodov

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HIGH POWER EXCIMER LASERS FOR INDUSTRIAL APPLICATIONS

V.M. BORISOV, O.B. KHRISTOFOROV, Yu.B. KIRYKHIN, S.G. KUZNETSOV,
Yu.Yu. STEPANOV and A.Yu. VINOKHODOV

The Troitsk Kurchatov Research Institute, Moscow Reg/142092, USSR

Pulse Laser System Laboratory has developed a wide research program of discharge pumped excimer lasers. The design and operation of high average power excimer laser systems is described. A large aperture (10x8cm) XeCL laser with UV preionization can produce 10 J per pulse at the repetition rates up to 100 Hz. When aperture decreased, XeCL laser operates at repetition rates of 500 Hz. Thus, we created several models of excimer lasers with different combinations of energy per pulse and repetition rate based on a single type of gas flow and power supply. The name of this models family is Gefest. The following table represents a summary of technical data of Gefest lasers.

Name of base model	Gefest-1	Gefest-3	Gefest-10
Wavelength	308 nm	308 nm	308 nm
Energy per pulse (max)	1 J	2.15 J	10 J
Repetition rate (max)	500 Hz	300 Hz	100 Hz
Pulse duration	70 ns	80 ns	100 ns
Beam crossection	1cmx5 cm	2.8cmx6 cm	8cmx10cm

The Gefest lasers can be used as a prototype for the development of commercial high power excimer lasers for industrial applications.

In the second part of the report we shall discuss our results on excimer laser applications:

1. materials processing;
2. high temperature superconductor films;
3. the mobile universal lidar (aerosol fluctuation and ozone profiles, composition and quantity of air pollutants).