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FOREIGN TECHNOLOGY DIVISION

SUMMARY OF ACHIEVEMENTS IN SCIENTIFIC RESEARCH

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HUMAN TRANSLATION

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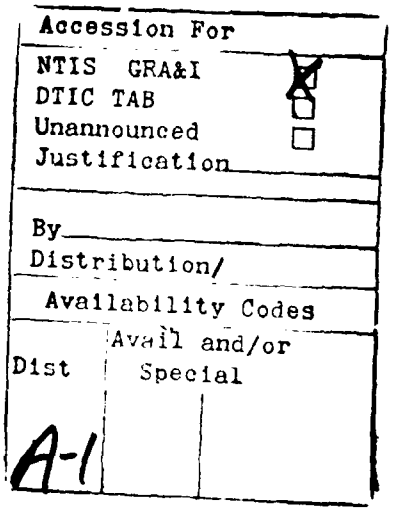

Summary of Achievements in Scientific Research

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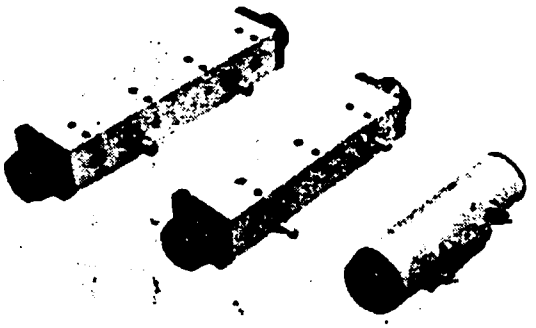
HDD Series, Single Lamp, Single Order Ruby Laser



Usages:

This series has five types including DD-06, 08, 10, 12 and 16. They can be applied in the field of medical treatment, spectral analysis, high speed photography, hole punching, welding, crop breeding, thermal processing, semiconductor technology, biophotochemical research and scientific experiments, etc..

Performance and technical index:

Recurrence frequency: 0.1 Hz; Output energy stability: 5%;
Divergent angle < 10 mrad; Static output energy 2 ~ 30J;
Dynamic energy: 0.3 ~ 2.5J; Dynamic pulse width: 20 ~ 40ns;
Peak Power: 7.5 ~ 75 MW.

HSD Series, Single Order, Dual Lamp Ruby Laser

Usages:

This series has four types includeing HSD-06, 08, 10 and 12. They can be applied in pulse holography and the fields which require concentrated facula, symmetry and good mode.

Performance and technical index:

Output energy: Static 2.5 ~ 15J; Dynamic 0.3 ~ 1.5J;
Pulse width: Static 0.5 ~ 1mS; Dynamic 20 ~ 40ns;
Divergent angle: 8 ~ 10mrad; Stability 5%.

HDZ Series, Recurrence Rate Ruby Laser

This series consists of two types: HDZ-10 and 12. They can be applied in the field of smear photography, range finding, lighting

of satellites and warheads. They can also be used in the aspects of teaching and scientific research, etc..

Performance and technical index:

Output wave length: 0.694μm; Recurrence frequency 1Hz;

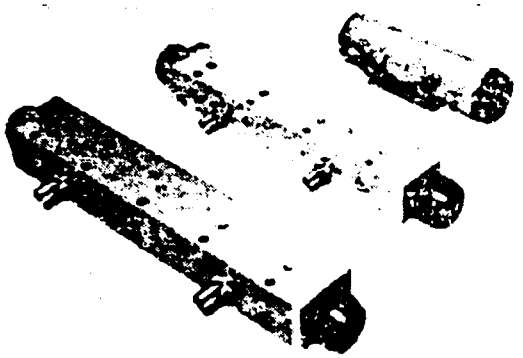
Output energy: Static 4 ~ 6J; Dynamic 0.5 ~ 0.75J;

Pulse width: 20 ~ 40ns; Peak power: 12 ~ 31MW;

Divergent angle < 10mrad;

Energy stability: Single order 5%; Recurrence rate 8%.

NDD Series, Single Lamp, Single Order Neodymium Glass Laser



Usages:

This series has five types including NDD-06, 08, 10, 12 and 16. They can be applied in medical treatment, spectral analysis, hole punching, welding, crop breeding, thermal treatment, semiconductor technology, biophotochemica. research as well as teaching and scientific experiments, etc.

Performance and technical index:

Output wave length: 1.06μm;
Divergent angle: 3 ~ 5 mrad;
Pulse width: 0.5 ~ 1ms;
Output energy stability 5%;
Output static energy 4~60J;
Recurrence frequency 0.1Hz.

NDZ Series Recurrence Rate Neodymium Glass Laser

Usages:

This series includes six types: NDZ-06, 08, 10, 12, 16 and 20. They are mainly used in various industry production fields, such as hole punching, welding and so forth. They can also be used in teaching and scientific research.

Performance and technical index:

Output static energy: 3.5 ~ 60J;
Pulse width 0.5 ~ 1ms;
Recurrence frequency 0.4 ~ 1 Hz;
Energy stability, single order 5%;
Beam divergent angle 3 ~ 5 mrad;
Recurrence rate 8%.

LQY-1 Acoustic-Photo modulated YAG Laser

Usages:

This type of laser can be used in electric resistance fine tuning, sheet product cutting, grooving as well as marking on various material and medical treatment, etc..

Performance and technical index:

Continuous power: 5 ~ 80W;

Peak power: 10 ~ 30kW;

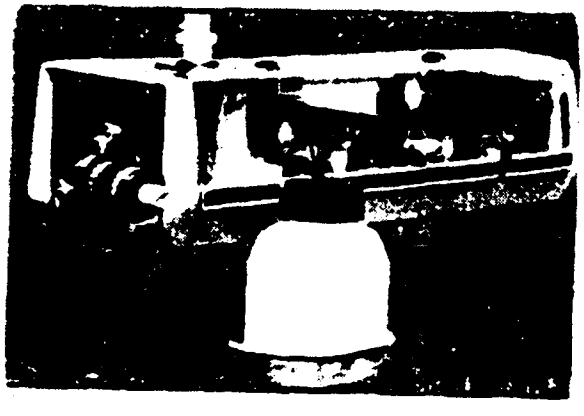
Recurrence frequency 1 ~ 40kHz;

Output wavelength: 1.06μm;

Beam diameter φ2 ~ 5mm;

Peak output stability <10%.

JAZL-1 Cancer Diagnosis and Treatment Laser



Usages:

This machine can be used in helping early cancer diagnosis and

YJG-1 Laser Sensitivity Detector for Chemical Agent

Usages:

This device can be used for light sensitivity quantitative determination for dynamite, detonators or other chemical agents. It can perform in-situ energy level inspections. Its precision is also high.

Performance and technical index:

Wavelength 1.06μm; Energy 0.1 ~ 25J;

Precision ±2.5%; Pulse width 200 ~ 650μs.

JGS-1 Type Laser Scan Radius Gauge

Usages:

This gauge can be used to determine various transparent or opaque pipes used in control systems. An error voltage signal can also be output for automatic control use.

Performance and technical index:

Noncontact dynamic measurement: Temperature of determined tube is 1400 °C ~ 1700 °C; Measurement range φ3~φ100mm; The precision

is better than the standard issued by the Light Industry Department; Digital output.

Laser Atomized Particle Microphotography System

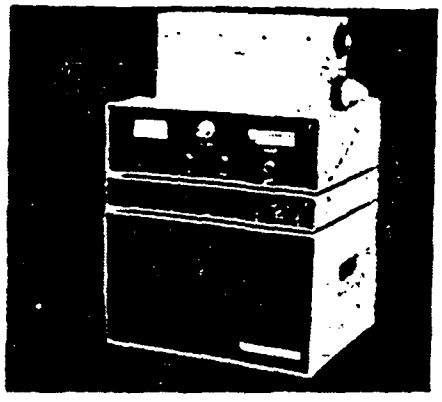
Usages:

This system is an on-spot high resolution photography which can be used in studying engine fuel atomizing, coal powder, water gas atomizing, particle corrosion model of wind tunnel, explosion and other instantaneous change scenes.

Performance and technical index:

Object view 5x7 ~ 27x37 mm;
Camera magnifying power 3 ~ 15 times;
Laser pulse width ‹100ns;
Pulse energy Et › 1.5J;
Object range ›300mm;
Resolution 5m;
Pulse number 1 ~ 9;
Pulse interval 20 ~ 400 ms.

XJSY-I Series Pulse Photographic Light Unit



Usages:

This unit can be used to conduct multiple-pulse exposure for a high speed flight object or particles as well as to perform the schlieren photography for a shock wave. It is a very powerful tool for high speed motion research.

Performance and technical index:

Output energy Et >1.5J; Pulse width <100ns;
Peak power: Single pulse output Es >40MW; Series pulses output, pulse energy is not less than 8MW for the first 5 pulses.
The entire set is appropriate for outdoor work.

HHF-1 Type High Speed Photographic Flash

Usages:

It is a high speed photographic light source for shooting various instantaneously changing processes and a shock wave field.

Performance and technical index:

Flash duration <0.5μs; Flash frequency: 2 ~ 100Hz.

TC Series Flight Object Capture

Usages:

It is used to perform noncontact detection and measurement for a high speed flight object. It can not only capture the target, but also determine the target velocity and the decay coefficient.

Performance and technical index:

Flight velocity 1 ~ 7km/s; Response time <50ns;
Flight object dimension ≤φ6mm.

WJJ-55A Automatic Controlled Motor Energy Saver

Usages:

This device is a self-adjusting, automatic controlled energy saver by using a single microprocessor board. It is suitable for a three-phase squirrel-cage motor whose power is under 55kw. This device is especially good for situations of light loading, load varying and frequent starting.

Performance and technical index:

Electrified wire netting voltage 380±10% V; Electrified wire netting frequency 50 Hz; Electricity saving rate is 10 ~ 30% in power phase, 20 ~ 40% in non-power phase. It contains 16 stages of soft starting functions which can substitute for the starter. It also has an out-of-phase protection function.

JQR2-4 Type Wavelength Scanner Controller

Performance and technical index:

Bidirectional wavelength scan, precision ±0.01nm;
Six scanning speeds;
Five-digit wavelength display, precision ±0.01nm;
Indicator precision ±0.01nm;

It has an automatic reboot function;
It can carry a three-phase step motor whose current is less than 4A.

CH-I Punching Machine Working Position Numerical Controller

Usages:

During a new product development in machinery manufacture or during a small lot trial production, a single punch can be used to substitute a punch core plate for the composite mould. This can reduce the research period and save expense.

Performance and technical index:

Z-80 single board processor;
The step number of the step motor and punching number can be displayed in a 5-digit decimal. Rotation rate 0.01 ~ 10 cycle/sec;
Allowable punching time: 0.1 second ~ 20 seconds; Step pitch angle 0.375°/step; Ten compensation intervals and adjustable compensation quantity.

XFL-1-2 Fine Dividing Circuit Driver of Step Motor

Usages:

It can be a driver of a terminal executing element for a high precision numerical control device, or be a driver of an executing element of a computer (microprocessor) control device. It is perfect for the industry of producing numerical control instruments and meters or high precision quantity controllers.

Performance and technical index:

Minimum step pitch resolution: 2 ~ 20 fine intervals;
Error <10%; High efficiency operation, efficiency 70%;
It has high interference resistance, anti-interference >7V;
It is suitable for a three-phase or five-phase step motor with current <6A.

GFY-1 Laser Light Intensity Distribution Detector

Usages:

Use to measure the lateral energy distribution for various continuous laser beams, as well as to determine the mode, divergence angle, mode stability, relative power density, diffraction attenuation, mode volume, power stability and etc..

Performance and technical index:

Response time: 1/100 s; Detection response 380V/W;

Spectrum range: 0.4 ~ 11μm; Energy range: 1mW ~ 50W.

I-1 Integral Type Laser Stability Detector

Usages:

Use to measure the output power stability for a continuous CO_2 laser.

Performance and technical index:

Wavelength range: 10.6μm; Power range: 1 ~ 1000W;

Spacial homogeneity 3%; Linearity <1%.

KJN-4 Energy Detector for High Speed Response Laser

Usages:

Use to measure the energy of a high recursive frequency laser and its output power. It can sample records in a high speed, fast and/or low speed displays, perform the mean value and root mean

square error calculations, etc..

Performance and technical index:

Applicable wavelength 1.06 or 0.69μm;

Sampling no. 100;

Record speed: 1000 times/second; Maximum scale: 1J;

Linear error: <5%.

JBD-2 Type Laser Wavelength Calibrator

Usages:

This unit uses the Ar and Ne nature spectrum as references to calibrate the wavelength of various pulse-adjustable dye lasers.

Performance and technical index:

Wavelength range: 0.4 ~ 0.75μm; Calibration precision: 1pm.

ZQ-200 Type Ultrasonic Modulator

Usages:

A series of 25μs interval pulse with 200ns pulses width can be

obtained by combining this unit and a pulse laser; a saw tooth modulated output of 5×10^7 Hz can be obtained by combining this unit with a continuous laser. It has special application in laser processing technology.

Performance and technical index:

Ultrasonic frequency: >20kHz; Peak interval 20 ~ 25μs;
Peak pulse width 200 ns.

JQ Series Crystal Q Modulating Unit

Usages:

It can produce a dynamic Q modulating large pulse when combined with a solid laser.

Performance and technical index:

Working form: Pressure discharging type;
Half wave voltage: KDP ~ 5.5kV, KD*P ~ 3.0kV;
Pulse width 20 ~ 40ns;
Breaking threshold ≥100MW/cm²

RS-1 Type Dye Recirculation System

Usages:

This unit can provide a stable, high speed dye jet with photography quality for a dye laser when it applies to a modulatory laser which has a continuous wave or a highly recursive frequency pulse.

Performance and technical index:

This system includes a circulation pump, cooler, filter, liquid container and shell, totalling five sections. Both the pump and piping are made of corrosion-resisting material.

Maximum pressure: 12kg/cm²; Maximum flow rate: 1.5L/min;

Working pressure: 8kg/cm²; Flow rate: 1.25L/min.

GQO-1, 2 Type Fiber Optic Coupler

Usages:

It is suitable for laser processing, telecommunication and medical treatment.

Performance and technical index:

Applicable wavelength: visible and near infrared;
Coupling efficiency: 70 ~ 90%.

ZZ100 Type Straight Telescope

Usages:

It can be used for various optical element adjusting, especially useful for solid laser resonator adjustment.

Performance and technical index:

Magnification 10 times; Angular resolution 1';
Dimension 30x50x200mm.

KS Series Laser Expanding Beam Telescope

Usages:

It is used as beam expansion for a laser to reduce the angular divergence, or can be installed reversely to increase high power intensity and used as long focus lanes.

Performance and technical index:

Slit dimension $\phi 5 \sim \phi 12$mm; Magnification 2 ~ 4 times;

Applicable wavelength 1.06 or 0.69μm;

Resolution 5" ~ 7.7".

Garnet Crystal Mixed with Neodymium, Yttrium and Aluminum

Dimension $\phi 4 \sim 8 \times 50 \sim 100$mm; Crystal direction $\langle 111 \rangle$;

Neodymium mixing quantity 0.8 ~ 1at%;

Interference strip $\langle$1 strip/inch;

Dulling ratio $\geq$25db;

Parallelism of both ends $\leq$20";

Flatness $\leq \lambda/4$; Perpendicularity $\langle$3';

Smoothness: above grade I;

Coating: single layer 1.06μm transparent film.

Holograde Ruby Crystal

Mixed Cr ion concentration 0.03 ~ 0.05at%;

Crystal direction 60°, 90°;

Interference strip 0.25 ~ 1.0 strip/inch;

Dimension: $\phi 6 \sim 12 \times 80 \sim 150$mm.

WG-1 Type Micro Optical Apparatus Seat

Usages:

An optical apparatus seat is the structure system used in the optical experiment, measurement and inspection facility. It is composed of basic structure elements and optical elements. It is very flexible and can be easily integrated into various high quality optical systems as well as various laser applied experiment setups and holographic experiment devices, etc.

Technical Services

In addition to providing modern technical services to the brother institutes of this institute, such as dynamic holo damage-free inspection, laser spectrum research, laser micro-processing, laser photochemical reaction, laser medical treatment and laser inspection, etc., this institute can also provide the following technical consultation and services.

1. Laser Parameters Determination

This institute is the Beijing Laser Determination Center approved by the National Science Committee and is responsible for the unified determination of external parameters and energy levels for national commonly used gas lasers, solid lasers and dye lasers, etc.

2. Laser Dynamic Holo Determination

This institute not only provides laser dynamic holo inspection devices for its brother institutes, but also owns a laser dynamic holo determination lab which is specifically for technology development, providing holographic experiment services for customers and promoting the dynamic holo determination technical services.

3. Laser Processing

This institute has a laser micro-processing lab which is equipped with a laser multipurpose processing machine. This machine can conduct various complicated micro-processes, such as punching, welding, sheet metal cutting, etc. when combining with a yttrium glass laser, recursive frequency YAG laser, continuous YAG laser, and adopting the ultrasonic modulation technique, acoustic photo Q modulating technique and simulation technique to achieve an excellent result which is impossible for general laser processing.

4. Laser High Speed Photography

This institute has series pulse Q modulating ruby laser systems which consists of four series of products. All can be applied to high speed schlieren photography, projectile

photography, engine fuel atomizing and flow field distribution analyses, etc.. The system has been actually applied in national defense and scientific research. This institute can also work together with customers to conduct high speed photographic experiments.

5. Microprocessor Application

This institute has a microprocessor application lab which exclusively conducts research in the field of energy saving, data processing, image processing, procedure control, instrument and meter used microprocessor, artificial intelligence, fluorescence analysis, machine tool modification and modern administration, etc. New application fields can be developed according to customers' requirements.

6. Film Coating

This institute can provide processing works of various optical thin film elements such as laser reflector, output lens, V shaped high efficient transparent film, various color scan films for a flat color scanning system, neutral spectroscopes of various transmissivity-reflectivity ratios, wideband spectrum calibrator, interferant optical filter and wideband transparent films, etc..

7. Optical System Design and Processing

This institute can provide designs and processing for optical elements and optical systems.

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