

NANOSECOND ND:YAG LASER STANDARD OPERATING PROCEDURE

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Section 1: Purpose

This document describes the standard operating procedures for utilizing the nanosecond pulsed, Q-Switched Nd:YAG laser.

Section 2: Application

The Nd:YAG laser is used for generating high energy, nanosecond pulses of visible and near-infrared illumination with high fluence and a narrow beam waist in order to excite transient optoelectronic processes in semiconductor materials.

Section 3: Equipment, Chemicals and Supplies

Spectra-Physics Quanta-Ray Model INDI-30 Nd:YAG Laser

Section 4. Personal Protective Equipment

The following equipment should be used:

- Laser safety glasses with optical density (OD) > 5 at wavelengths of 532 nm and 1064 nm.

Section 5: Operational Procedures

1. **To use the Nd:YAG laser, you must have specific laboratory safety training, complete the Caltech EHS laser safety course, and be approved by group laser admin.**
2. Close both doors to the optics room (221A).
3. Turn on the external lights to indicate that the diode laser is in use and entry is forbidden.
4. Wear appropriate laser safety glasses as indicated in Section 4
5. Turn on power to external cooling fan.
6. Turn "MAIN POWER" to on position (down position).

7. Turn key switch to on position (right position)
8. Turn on Ch1 and Ch2.
9. Verify controller settings
 - a) Lamp energy: start
 - b) Variable and replate: fixed
 - c) Q-Switch delay: halfway position
 - d) Q-Switch mode: Q-Switch
 - e) Source switch: INT
 - f) Single Shot: rep
 - g) Lamp: on
10. After use, deactivate laser by following steps in reverse order

Section 6. Primary Hazards

Class 4 Laser Radiation: The laser can emit 1 J of optical energy in a 7 ns pulse. This timescale is much shorter than the human blink reflex and if absorbed by the eye will result in permanent vision damage.

Section 7. Engineering Controls to Prevent and Mitigate Hazards

The laser is mounted to an optical table and setup with a defined optical path. The laser should not be removed and operated elsewhere.

Section 8. First Aid and Emergency Procedures

Unprotected Eye Contact:

Seek emergency medical assistance immediately.