

**University of Texas Health Science Center at San Antonio  
Standard Operating Procedures for  
Prairie Confocal and Multiphoton Microscope  
Optical Imaging Core Facility  
STRF 252, Greehey Campus  
Laser Control Area  
July 24, 2013**

Prepared by Exing Wang

Laser Custodian:

Exing Wang

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Name Printed

Signature

Date

Laser Safety Officer:

Jennifer Cerecero

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Name Printed

Signature

Date

## **INTRODUCTION**

The Prairie confocal and multiphoton microscope (the far booth from the entrance) contains the following lasers:

### **Class    Type/Model**

3B	Diode/Cube	(405 nm)
3B	Solid state/Excelsior	(488 nm)
3B	Solid state/Excelsior	(543 nm)
3B	Solid state/Excelsior	(561nm)
3B	Diode/Cube	(647 nm)
4	Coherent Verdi	(532 nm)
4	Coherent fs-pulsed Tunable Ti:Sapphire	(720-920 nm)

All the visible lasers are connected to the Nikon FN1 upright microscope via a fiber optic cable. All 3B visible lasers and their power supplies are integrated into a single wheeled unit that is placed under the anti-vibration table. The output of the MIRA laser is directly coupled through enclosed light path to the microscope.

### Primary Laser Custodian:

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### Authorized Primary Users

A list of authorized users is on file with Environmental Health and Safety. This list will be updated as frequently as needed.

### Incidental Personnel

In addition to the authorized primary users, incidental personnel may be in the room at the time of the experiment. These personnel are not trained on the system, nor have they gone through the laser safety program. They will be observing only and not involved in the operation of the system. They will not be in the room during any alignment or maintenance of the lasers.

### Normal Laser Operation

Prairie confocal/multiphoton system contains the following lasers:

Class	Type	Model	S/N	Wavelength	Power output
3B	Diode	CUBE	L22798114	405nm	100 mW
3B	Solid State	Excelsior	CMX1-04473	488 nm	50 mW
3B	Solid State	Excelsior	500004	542 nm	50 mW
3B	Solid State	Excelsior	500077	561 nm	50 mW
3B	Diode	Cube	L94175611	640 nm	40 mW
4	Coherent CW	Verdi 5W	V5-A4868	532 nm	5 W
4	Coherent fs	Mira 900	0004546	720-920 nm	<1W

All Class 3B visible lasers are connected to the Nikon FN1 microscope via a fiber optic cable. All 3B visible lasers and their power supplies are integrated into a wheeled box

that is placed on the floor under the anti-vibration table. The Class 4 Coherent CW 5W pump laser is directly coupled in an enclosed pathway to the Coherent femtosecond pulse laser Mira 900 which itself is directly coupled to the microscope in an enclosed pathway. Both Class 4 lasers are placed on the anti-vibration table.

The sole purpose of the lasers is for fluorescence confocal (Class 3B lasers) and multiphoton (Class 4 lasers) microscopy.

### **Eyewear**

Wavelength specific eyewear will be used by field service engineers during alignment.

### **Alignment Hazard Control**

All Class 3B lasers are aligned by service engineers and are not adjusted by users or facility staff.

The Coherent MIRA/5W VERDI fs-TiSaph is aligned through the direct-coupled optics per manufacturer procedures. When changing operating wavelength it may be necessary to adjust alignment mirrors. These adjustments will only be performed by the primary and alternate custodians while wearing appropriate laser protective eyewear. The NIR beam is visualized using a hand held NIR viewer.

### **Laser Hazard Control**

1. Access to STRF 252 is restricted to trained personnel. The room is locked all the time and is secured by a card-access door reader. All access is approved by the campus police.
2. The entire system is enclosed by laser proof curtain.
3. Operation of all Class 3B lasers is only accessible through the system software. Computer access is restricted to trained users with unique login names and passwords.
4. Power control and wavelength adjustment for the Class 4 lasers is accessible by the core staff only.
5. "Laser in Use" warning sign is mounted above the entrance of the enclosed system booth.
6. All lasers are enclosed with no open beam throughout the path.
7. All users are trained in the operation of the Prairie system and the proper use and care for the lasers.

Primary users are trained in the operation of the Prairie confocal and multiphoton imaging system and the proper use care for the lasers.

### **Authorized User Signatures**

The operating procedure is reviewed and understood by each authorized laser user during initial training on the system.