

Experiment Safety Review Form

Review Number: AD-020-2015-APR-13

PRINCIPAL INVESTIGATOR: Antonio Ting

GROUP: NRL & ATF

EXT: 5801

E-MAIL: ting@nrl.navy.mil

LIFE NUMBER: G9395

Project Title: Interaction Physics of Pico-second far-IR Terawatt Laser with Materials
Location(s): 0820, Other
Area(s): ATF FEL ROOM

SIGNATURES:

Principal Investigator: Antonio Ting	Date:
Experiment Review Coordinator: Peter Cirnigliaro	Date: 7/16/2015
Co-PI or Alternate Contact (s): Kusche, Karl	Date:
Reviewer: Asher Etkin	Date: 6/11/2015
Reviewer: Raymond Karol	Date: 7/8/2015
Reviewer: Karl Kusche	Date: 6/9/2015
Reviewer: Mikhail Fedurin	Date:
Reviewer: Frank Craner	Date: 6/17/2015
Review/Approval (ERC) Comments: 07/16/2015 10:11 AM ESRC Chair has approved this experiment, with the condition that all power supplies be NRTL approved devices or inspected by a Laboratory approved NRTL inspector.	
Walkthrough Signature:	Date:
Next Annual Review Date: 7/31/2016	
FUA Change Required? No	
Fire Rescue Run Card Changes Required? No	
Has a NEPA Review been Performed for this Project? Don't Know	
Required Approvals (i.e., IACUC, IBC, etc.):	
Project Termination Acceptance Signature:	Date:
Comments:	

I. Define the Scope of the Work

A. Description

We propose to study the interaction of psec terawatt CO2 laser pulses with materials to explore physical process that govern the absorption, ablation, ionization, plasma formation and plasma dynamics. Plasma properties such as density profile, flow dynamics, electron heating and cooling, and electron energy distributions will be probed and examined to understand the underlying processes for various material characteristics. The study will be carried out using the ATF Terawatt Carbon Dioxide (CO2) Laser.

Using the existing ATF Ion Generation configuration in the FEL room (see approved ESR AD-014-2014-AUG-12), solid sample targets [a) 24 layer woven silica cloth and high temperature silicone resin; b) multiple layer borosilicate woven cloth and E-glass epoxy resin] will be positioned inside of the vacuum chamber near the laser focus. Air will be used to create a surface-gas interface for the laser-matter interaction. Diagnostics will measure laser beam and target properties.

Equipment manuals or procedures that are controlled documents:

None.

B. Human Performance Factors

TBD.

C. Waste Minimization/Pollution Prevention

No wastes will be generated from this experiment. Solid targets will be returned to PI/home institution.

D. Materials Used /Waste Generated

Materials Used	Disposal Method	Amount per Use	Amount per Year	Comments
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II. Identify and Analyze Hazards Associated with the Work

The following hazards were identified:

Physical Hazards:

- None

Chemical Hazards:

- None

Ionizing and Non-ionizing Radiation Hazards:

- Class 3B (nonvisible >15mW) or 4 lasers
(Area: Other-ATF FEL ROOM)

Biological Hazards:

- None

Offsite Work:

- None

Other Issues (Security, Notifications, Community, etc.):

- None

Significant Environmental Aspects

- None

III. Develop and Implement Hazard Controls and Assess Risk

A. Physical Hazards, Tasks and Controls

None

B. Chemical Hazards, Tasks and Controls

None

C. Environmental Hazards, Tasks and Controls (include on/off site transportation and products/services)

None

D. Radiation Hazards, Tasks and Controls

Hazard, Default Controls, Task Specific Info	Risk Level
<p>Hazard: Class 3B (nonvisible >15mW) or 4 lasers</p> <hr/> <p>Default Controls: Administrative Controls • Complete registration form, submit to Laser Safety Officer(LSO) • Complete Laser Controlled Area SOP, submit to LSO • Contact LSO for posting requirements • Obtain baseline Laser eye exam • Training: Laser Safety (TQ-LASER) Engineering Controls • Beam barriers/blocks • Interlocks are required for Class 4 Laser Controlled Areas * PPE as specified in SOP</p> <hr/> <p>Task Specific Info: Operation & configuration of lasers already approved under existing ATF CO2 laser SOP (C-A-820-2) and ESR (AD-014-2014-AUG-12).</p>	<p>Acceptable (21-40)</p>

E. Biological Hazards, Tasks and Controls

None

F. Offsite Work Hazards, Tasks and Controls

None

G. Other Issues (Security, Notifications to Other Organizations, Community Involvement, etc.)

None

H. Recommended Exposure Monitoring

- None

Description or comments:

I. EPHA Determination

Chemical Name	Quantity (lbs, gal)	Location (Bldg/Room#)
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IV. Perform Work Within Controls**A. Recommended Training and Medical Surveillance Summary**

- ATF User JTA (GE-53A)

B. Personnel Training, Qualification, and Authorization List

Employee/Guest Name	Life/Guest#	Dept	Required Training Course(s)	Signed
Antonio Ting	G9395	DB	(TQ-LASER) [EXPIRES: 10/29/2016] (OM-MEDSURV-LASER) [EXPIRES: NEVER] ATF User JTA (GE-53A) [COURSE NOT FOUND]	
Igor Pogorelsky	19752	AD	(TQ-LASER) [EXPIRES: 8/5/2015] (OM-MEDSURV-LASER) [EXPIRES: NEVER] ATF User JTA (GE-53A) [COURSE NOT FOUND]	
Michael Helle	P9406	DB	(TQ-LASER) [EXPIRES: 10/20/2016] (OM-MEDSURV-LASER) [EXPIRES: NEVER] ATF User JTA (GE-53A) [COURSE NOT FOUND]	
Yu-hsin Chen	P9177	DB	(TQ-LASER) [EXPIRES: 10/20/2016] (OM-MEDSURV-LASER) [EXPIRES: NEVER] ATF User JTA (GE-53A) [COURSE NOT FOUND]	

C. Emergency Procedures

Follow existing CO2 laser SOP (C-A-820-2) and LEP. In an emergency, push any blue emergency laser stop button to halt laser hazard in the room.

D. Transportation

None

E. Logistical Interactions

None

F. Termination/Decommissioning

Targets will be returned to PI/home institution.

V. Provide Feedback

None

VI. Attachments

Note to ESRC: PI has specified that "All information on the second diagnostic is sensitive."

Attached Files:

[Proposal to ATF CO2 laser matter interaction April 10-2015.docx](#)