The only official copy of this file is the one online at https://ias.bnl.gov/esr/

Date Printed: Sep 4, 2015

Experiment Safety Review Form
Review Number: AD-021-2015-AUG-18

PRINCIPAL INVESTIGATOR: Ivan Gadjev
GROUP: UCLA
EXT: 2545 **E-MAIL: ivangadjev@gmail.com** **LIFE NUMBER: P8235**

Project Title: Back-reflected Inverse Compton Scattering (AE70).	
Location(s): 0820	
Area(s): 0820-ATF Beamline #2	

SIGNATURES:

Principal Investigator: Ivan Gadjev	**Date:**
Experiment Review Coordinator:	**Date:**
Co-PI or Alternate Contact (s): Kusche, Karl	**Date:**
Reviewer: Asher Etkin	**Date: 9/2/2015**
Reviewer: Raymond Karol	**Date: 9/2/2015**
Reviewer: Dana Beavis	**Date: 9/3/2015**
Reviewer: Karl Kusche	**Date: 9/2/2015**
Reviewer: Mikhail Fedurin	**Date:**
Reviewer: Frank Craner	**Date: 9/2/2015**
Review/Approval (ERC) Comments:	
Walkthrough Signature:	**Date:**
Next Annual Review Date: 8/31/2016	
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: **Comments:**	**Date:**

I. Define the Scope of the Work

A. Description

The goal of this experiment is to produce two ICS (Inverse Compton Scattering) X-ray bursts by reflecting the double pulse CO2 Laser that is initially co-propagating with the electron beam. The CO2 pulse is reflected back onto the 65 MeV electron bunch by a spherical copper mirror. We expect to generate 10^8 ICS X-ray photons at 7.5 keV per pulse. An empirical measurement of the bremsstrahlung background will be done without CO2.

The double pulse and retro reflection scheme is motivated by the possibility of coupling an IFEL (Inverse Free Electron Laser) beam into an ICS event. The current collaboration between UCLA and BNL-ATF in both IFEL and ICS experiments presents a great opportunity to attempt the unification of the two. A successful implementation will demonstrate the applicability of IFEL and justify the potential of ICS as a compact X-ray source for scientific research.

Equipment: MCP (microchannel plate), laser optics, Be window.

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.

D. Materials Used /Waste Generated

Materials Used	Disposal Method	Amount per Use	Amount per Year	Comments

II. Identify and Analyze Hazards Associated with the Work

The following hazards were identified:

Physical Hazards:

- None

Chemical Hazards:

- Storage or use of Beryllium or Beryllium articles. Attach Beryllium Use Review Form if checked.
  (Area: 0820-ATF Beamline #2)

Ionizing and Non-ionizing Radiation Hazards:

- Class 1M, 2/2M,3R lasers
  (Area: 0820-ATF Beamline #2)
- Class 3B (nonvisible >15mW) or 4 lasers
  (Area: 0820-ATF Beamline #2)
- Static magnetic fields >5 G and <600 G (attach exposure form)
  (Area: 0820-ATF Beamline #2)
- ATF linac (Other)

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

Hazard, Default Controls, Task Specific Info	Risk Level
Hazard: **Storage or use of Beryllium or Beryllium articles. Attach Beryllium Use Review Form if checked.** **Default Controls:** Engineering Controls Administrative Controls • Complete the Beryllium Use Review Form. • Machining of beryllium prohibited Training: • Beryllium Use at BNL (TQ-BERYLLIUM1) PPE: Nitrile glove Comply with the SBMS Subject Area: “Beryllium”. **Task Specific Info:** The 250 um thick Be window is mounted in a 2 3/4” Conflat flange, is not touched directly, is inspected for oxidation when in use, is stored in a sealed/labeled container when not in use. The window is never modified in any way, and falls under the definition of a “Be article” as per SBMS. If a window breaks, the ES&H Coordinator and Industrial Hygiene will be notified to assist in cleanup and monitoring. BURF already on file as part of ESR AD-007-2014-FEB-3.	**Negligible (0-20)**

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
Hazard: **Class 1M, 2/2M,3R lasers** **Default Controls:** Administrative Controls • Complete registration form and laser use permit for laser(s), submit to Laser Safety Officer (LSO) • Contact LSO for posting requirements Comply with Subject Area “Laser Safety” **Task Specific Info:**	**Negligible (0-20)**

	Class 3 HeNe lasers (visible) used for alignment. Beams contained within existing transport paths in Exp Hall. Eyewear not required.	
Hazard:	**Class 3B (nonvisible >15mW) or 4 lasers** **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 **Task Specific Info:** Class 4 laser beam originates from ATF CO2 laser system (covered under existing Laser SOP, see C-A-820-2), and is delivered to beamline #2 in Exp Hall via existing transport line. Laser is operated by trained ATF CO2 laser operator only. Operation of laser and transport of beam controlled via existing ATF laser interlock system. Eyewear required for 10.6 micron infrared, as per existing postings.	**Acceptable (21-40)**
Hazard:	**Static magnetic fields >5 G and <600 G (attach exposure form)** **Default Controls:** Administrative Controls • Request SMF survey through SHSD • Complete JAF or Non-Employee Static Magnetic Field Questionnaire for exposed employees/workers • Training: TQ-SMF (supervisors) • Appropriate posting (see Subject Area) **Task Specific Info:** Magnetic fields within devices are not accessible by body parts, and are less than 10 G accessible from outside. ATF experimental hall is already posted for >5 G magnetic field hazard.	**Negligible (0-20)**
Hazard:	**ATF linac (Other)** **Default Controls:** **Task Specific Info:** 65 MeV electrons. The ATF linac is operated under existing radiation interlock system, shielding, postings, documentation and approvals. All personnel have GERT training & TLD for Controlled Areas.	**Negligible (0-20)**

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#)

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
Ivan Gadjev	P8235	DB	(TQ-LASER) [EXPIRES: 6/19/2016] (OM-MEDSURV-LASER) [EXPIRES: NEVER] ATF User JTA (GE-53A) [COURSE NOT FOUND]	
Yusuke Sakai	Z9325	DB	(TQ-LASER) [EXPIRES: 1/5/2017] (OM-MEDSURV-LASER) [EXPIRES: NEVER] ATF User JTA (GE-53A) [COURSE NOT FOUND]	
Mikhail Fedurin	23594	AD	(TQ-LASER) [EXPIRES: 5/27/2017] (OM-MEDSURV-LASER) [EXPIRES: NEVER] ATF User JTA (GE-53A) [COURSE NOT FOUND]	9/4/2015 10:58:14 AM
Karl Kusche	19960	AD	(TQ-BERYLLIUM1) [EXPIRES: 4/9/2017] (TQ-LASER) [EXPIRES: 4/22/2017] (OM-MEDSURV-LASER) [EXPIRES: NEVER] ATF User JTA (GE-53A) [COURSE NOT FOUND]	9/4/2015 10:07:09 AM
Igor Pogorelsky	19752	AD	(TQ-LASER) [EXPIRES: 7/24/2017] (OM-MEDSURV-LASER) [EXPIRES: NEVER] ATF User JTA (GE-53A) [COURSE NOT FOUND]	
Mikhail Polyanskiy	23682	AD	(TQ-LASER) [EXPIRES: 7/9/2017] (OM-MEDSURV-LASER) [EXPIRES: NEVER] ATF User JTA (GE-53A) [COURSE NOT FOUND]	

C. Emergency Procedures

The ATF has approved procedures, interlocks and emergency stop buttons to safeguard personnel during linac and laser operations. Linac operators are trained as LEC. Relevant documentation, as well as the Bldg 820 Local Emergency Plan, can be accessed online.

D. Transportation

None.

E. Logistical Interactions

None.

F. Termination/Decommissioning

Upon termination, any in-vacuum parts exposed to the electron beam require an activation check prior to release from the experimental area.

V. Provide Feedback

None

VI. Attachments

Attached Files:

cu mirror and pinhole basic drawing.jpg

chamber with pinhole and mirror.JPG

ICS_beamline_config.jpg