

Title of experiment:

Muonium Formation and Ionization in Semiconductors and Insulators

Beam line(s): M20 *and/or* M15

Description: Time-differential and/or time-integral μ^+ SR experiments on various inert solids (semiconductors and insulators) in various cryostats using magnetic fields up to about 7 T with RF resonators and electric fields of up to about 100 kV/cm.

Name of group: μ SR in Solids:

J.H. Brewer (UBC Physics),
V.G. Storchak (Kurchatov Inst., Moscow),
D.G. Eshchenko (PSI),
E. Morenzoni (PSI), B. Hitti (TRIUMF),
R. Lichti (Texas Tech. Physics),
S.L. Stubbs (UBC Physics),
S.P. Cottrell (RAL/ISIS)
D.J. Arseneau (TRIUMF),
S.R. Kreitzman (TRIUMF)
and possibly others at one time or another.

Experimental Leader: Prof. <i>Jess H. Brewer</i>	<i>and</i>	Dr. <i>Vyacheslav G. Storchak</i>
Dept. of Physics & Astron.		Lab. of Appl. Muon Phys.
Univ. of British Columbia		Dept. of Nuclear Physics
Vancouver, BC		Russian Science Centre
Canada V6T 1Z1		“Kurchatov Inst.”
phone: (604)822-6455		Kurchatov Sq. 46
fax: (604)822-5324		Moscow, Russia 123182
internet: jess@triumf.ca		fax: (095)196-4546
		internet: mussr@triumf.ca

Local contact: *Jess H. Brewer* (see above) home phone: 604-274-1077.

Safety Project Coordinator: *Jess H. Brewer* (see above)

Responsibilities: Common sense and due diligence in promoting it in others.

Facilities required:

- Existing μ SR Facility equipment: *Omni*, *Omni'*, *LAMPF*, *HiTime* or *DR* μ SR spectrometers; cryostats and temperature controllers; counters, cabling, electronics, computer *etc.*
- We have built and used a HV power polarity reversing system to deal with samples where ionization-liberated charges are not efficiently collected by the electrodes and the voltage must be periodically reversed. This should present no new hazards.
- The Facility's RF resonator insert may be used in some of the experiments.
- *Belle* or *HiTime* 7 T superconducting magnet.
- This experiment will run consecutively with other μ SR experiments and will usually require no special apparatus modifications except for safeguards associated with sample materials (see below).

Hazards:

- *Apparatus Hazards:* Normal storage and transfer of liquid helium in conventional Dewars and a large superconducting magnet presents minimal hazards.
High voltage (up to ~ 2500 V) will sometimes be applied to the samples within their cell inside a cryostat using high voltage feedthroughs. This system has already been tested without trouble and will be further tested on inert samples "off-line" to higher voltage than will be used (later) in the actual experiments.
- *Sample Hazards:* All the samples used will be innocuous semiconducting or insulating solids.

Safety Measures:

- Nothing special required.

Decommissioning or Disposal:

- All the samples are non-toxic and inert; they will be stored on site or returned to their owners.