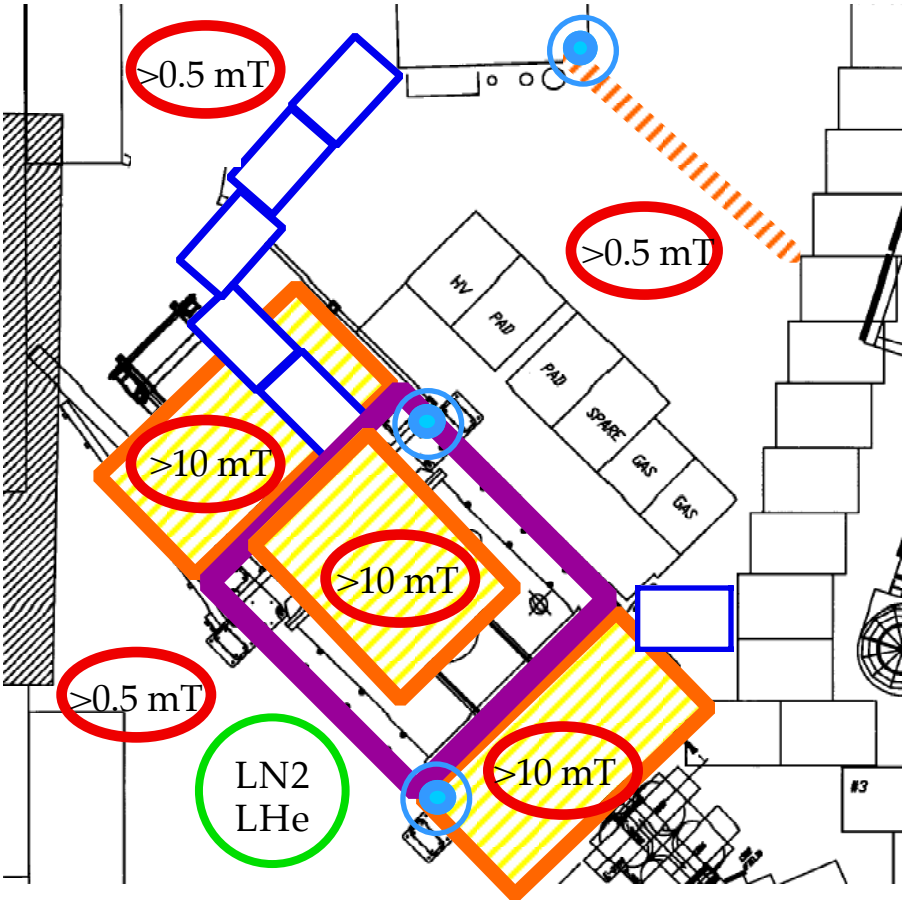
M13 and TWIST Magnet Safety

November 2001

ANYONE WORKING OR SUPERVISING CRANE OPERATIONS IN THE POSTED AREAS MUST ACKNOWLEDGE READING THIS DOCUMENT ON THE SIGN-OFF SHEET IN THE TWIST COUNTING ROOM.

1. TWIST Magnet Fields

When the TWIST magnet is energized areas accessible to personnel and equipment contain magnetic fields which pose safety hazards. They are illustrated here:



The presence of magnetic fields will be indicated by **blue strobe lights** indicated in the figure. In order of increasing severity, they are:

A. **Fringe fields 0.5 - 10 mT (5 - 100 gauss).** This area can be assumed to be anywhere within 4 m of the purple magnet, including the M13 radiation lock-up area *plus* a region around the rolling plaform extending out to the dashed line on the floor.

B. **High fringe fields 10 - 100 mT (100 - 1000 gauss).** This includes the areas adjacent to the upstream and downstrteam endplates and regions on top of the magnet near the openings for the cryostat and detector services.
C. **High field regions 0.1 - 2 T (1 - 20 kgauss).** This includes the area within 10 cm of the upstream/downstream endplates, through the beam axis holes in the iron, and into the detector region inside the iron yoke.

2. Hazards

0.5 - 10 mT (5 - 100 gauss)

- Danger to function of active **medical implants** (pacemakers, etc.) and small metallic implants (e.g., aneurysm clips).
- Corruption of **magnetic records** (credit cards, disks, etc.)**.**
- Interference with or damage to **sensitive equipment** (e.g., watches, some electronics).

10 - 100 mT (100 - 1000 gauss)

- **interference with** the use of **ferrous metallic** items, including possible loss of control resulting in **damage or injury from flying objects.**
- **interference with large medical implants** (plates, joints,etc.).

0.1 - 2 T (1 - 20 kgauss)

- **damage or injury from flying objects due to strong forces on ferrous metallic items.**
- **interference with** the use of **non-ferrous metallic items in motion** (eddy currents).

3. Safety Precautions

- **Signs** posted for all areas **greater than 0.5 mT.**
- **Blue strobe lights** actuated by field sensing switch **visible from affected areas and the crane.**

4. Safety Procedures

- **Sweep of affected areas must be carried out before magnet is energized for ferrous materials.**
- **NO ferrous materials to be brought into the >10 mT areas while the magnet is energized.**
- **All crane operations** in the area (e.g., LN,LHe dewars to the illustrated circle in the figure) **must be supervised by a responsible person** of TWIST or the Experimental Support Group.

Safety Coordinator: John Macdonald
TRIUMF
Telephone: extension 7348
email: jam@triumf.ca