Proton Driver: halos, losses, bunching . . .

Target/Magnet:

Measuring the ioniz. of the water: *D. Bartels*

Damage to the Magnet Structure: *Y. Gohar*

Cooling line: *Instrumentation Workshop*

Philosophy

Limited variables ⇒ minimal instrumentation set

Profile - Required

Intensity - hard

Loss mon - very hard

Backgrounds – from timing

Alignment: ⇐ pencil beams, transfer fns (profile mon)

Time Resolution: very useful (and maybe cheap)

Tuneup and running instrumentation may be different.

Techniques

Beam:

Scintillators, Faraday cups and SEMS,

Semiconductor Arrays (*Placidi*), and other options

Absorbers: Bolometers, Schlieren

Access: between SC coils, rf and coils

Possible Instrumentation Package

Required space, access

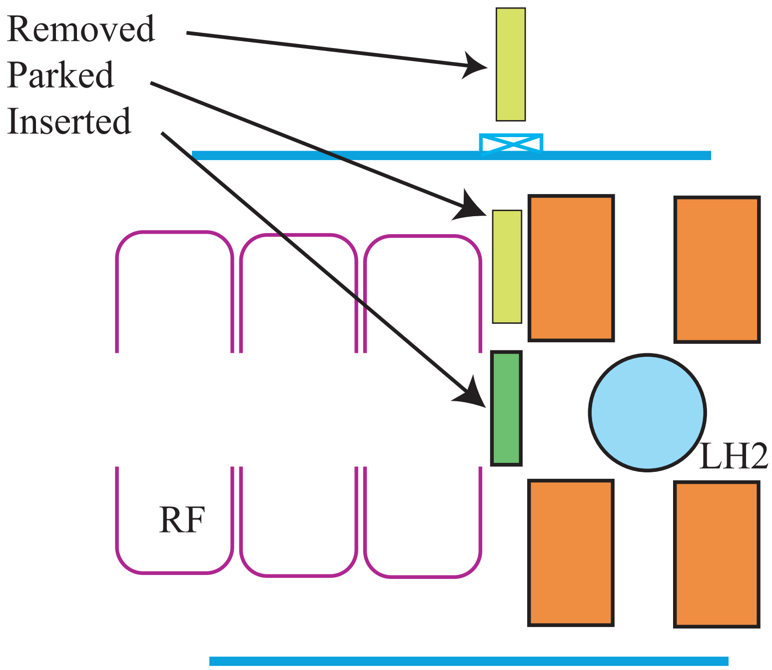
Concerns: rf pickup, beam backgrounds

Accelerator: *TJNL*

Pencil beams, Transfer Functions, Loss mon

Storage Ring: *FNAL*

We need a way move instrumentation around.



Concerns about cooling line instrumentation:

- Backgrounds should not be much of a problem.
  The intense ~10^{12} bunch should dominate everything.
    - Protons and ch. hadrons will be out of time.
    - Dark currents and xrays will be weak & out of time.

- The muon cooling experiment should have produced reliable instrumentation.

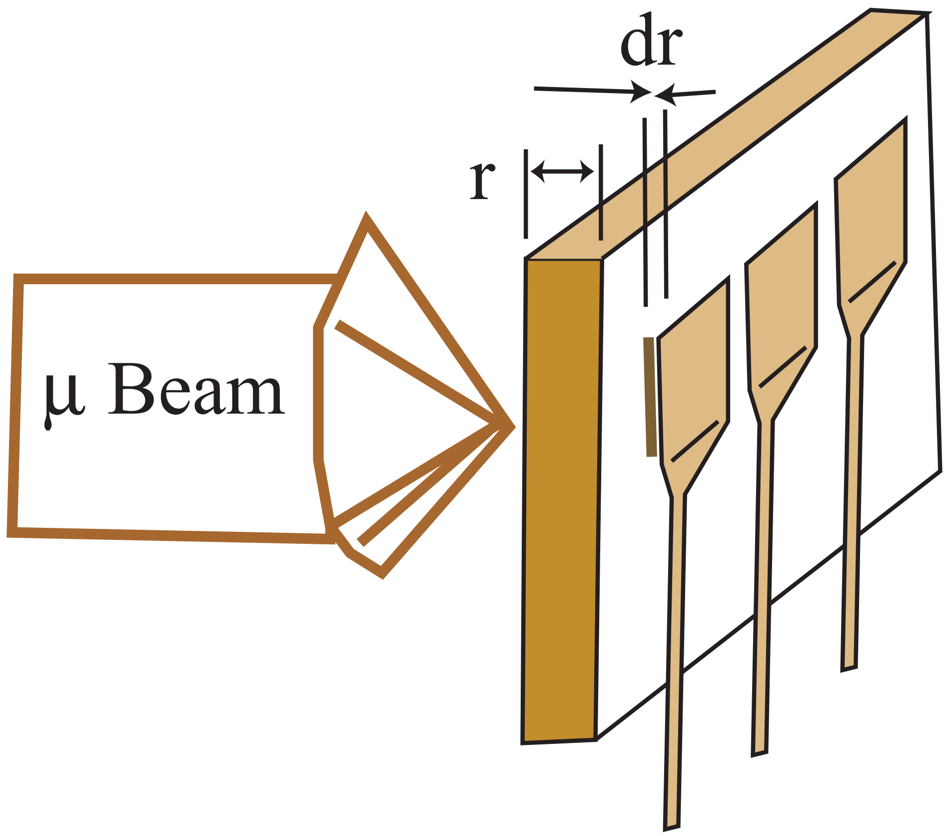
  Cooling experiment instrumentation will have weaker muon beams, worse signal /noise ratio, more problems with backgrounds

- Space and access are very limited.
  Available space very close to magnets and rf.
    - How does B field affect things?
    - Will the rf cause pickup at 200 MHz?
      ⇒ see results from Lab G
    - Valves for vacuum interlock are big.

- The devices should be thin, but would be retracted anyway, during normal operaton.

- Beam heating will be significant and cooling will be required.

And we need techniques which are reliable and rad hard. We are going in this direction . . .



The r and dr measurements determine if the device is a Faraday cup or a SEM, the operation is similar.

- Stripline pickups can give 50 Ω impedance.
- Time response ~ size/(velocity of light) ~ 100 ps
- Beam current ~10^{12}/1 ns ~ 160 A
- Signal = IR ~ 8000 V (as Faraday cup)
  ~ (secondary em coeff) IR ~ 160 V (as SEMs)