Purpose of this Mini-Workshop

- To get experts' help on 8 GeV H^- ions
  - One of the two major technical challenges to a SCRF linac Proton Driver
  - A factor of 10 in energy jump from today's H^- beam (highest: 800 MeV at PSR)
  - Can we transport them? Can we strip and inject them?
- Participants:
  - BNL: J. Wei, YY Lee, D. Raparia
  - LANL: R. Macek, T. Spickermann, A. Jason
  - ANL: P. Ostroumov, L. Teng
  - ORNL: R. Shaw
  - U. New Mexico: H. Bryant
  - Fermilab: Proton Driver study group
- Topics:
  - Reports from existing machines and machines under construction (BNL Booster, Fermilab Booster, PSR and SNS)
  - Review of a document on 8 GeV H^- ions
- Note:
  - The focus is on physics, not on design. We will not present detailed design of the transport line or injection region.

Transport and Stripping of 8 GeV H^- Ions

(FERMILAB-TM-2285-AD-T)

OUTLINE

1. Introduction
2. Atomic Physics of 8 GeV H^- ions
   - 2.1. General physics of H^- ions
   - 2.2. Blackbody radiation stripping
   - 2.3. Magnetic field stripping
   - 2.4. Residual gas stripping
   - 2.5. Lifetime of Stark states of hydrogen atoms
   - 2.6. Population of Rydberg states of hydrogen atoms
3. Foil Physics
   - 3.1. Stripping efficiency
   - 3.2. Multiple Coulomb scattering
   - 3.3. Large angle Coulomb scattering
   - 3.4. Energy deposition and heating analysis (MARS)
   - 3.5. Heating and stress analysis (ANSYS)
   - 3.6. Radiation activation
4. Beam Physics of an 8 GeV H^- transport line
   - 4.1. Collimation
   - 4.2. Energy jitter correction
   - 4.3. Radiation activation
5. Summary

Agenda

Thursday, December 9, 2004, 1-North

Reports

08:30-08:35	Welcome – S, Holmes (Fermilab)
08:35-08:45	Purpose of this workshop – W. Chou (Fermilab)
08:45-09:15	Fermilab Proton Driver Project – G.W. Foster (Fermilab)
09:15-09:45	BNL 200 MeV H^- transport and injection – D. Raparia (BNL)
09:45-10:15	Fermilab 400 MeV H^- transport and injection – J. Lackey (Fermilab)
10:15-10:45	Coffee break
10:45-11:15	LANL 800 MeV H^- transport and injection – T. Spickermann (LANL)
11:15-11:45	PSR beam losses at injection – R. Macek (LANL)
11:45-12:15	SNS 1 GeV H^- transport and injection – Y.Y. Lee (BNL)
12:15-01:30	Lunch

H^- physics

01:30-02:00	Overview of the 8 GeV H^- document – F. Ostiguy (Fermilab)
02:00-02:30	Blackbody radiation stripping – H. Bryant (U. of New Mexico)
02:30-02:50	Magnetic field stripping measurement – A. Jason (LANL)
02:50-03:10	Field stripping and residual gas stripping – W. Chou (Fermilab)
03:10-03:40	Coffee break
03:40-03:55	Radiation activation on beam pipes – M. Kostin (Fermilab)
03:55-04:10	Observation of residual dose on the Main Injector pipes – B. Brown (Fermilab)
04:10-05:30	Working session on 8 GeV H^- transport losses
07:00	Dinner at Chez Leon

Agenda

Friday, December 10, 2004, 1-North

Foil physics

08:30-08:50 Foil stripping efficiency and multiple Coulomb scattering – W. Chou (Fermilab)

08:50-09:10 Lifetime of H^0 Stark states and population of H^0 Rydberg states – A. Drozhdin (Fermilab)

09:10-09:30 Foil heating and stress analysis using ANSYS – Z. Tang (Fermilab)

09:30-10:00 Energy deposition, foil heating and radiation activation using MARS – M. Kostin (Fermilab)

10:00-10:30 Coffee break

10:30-10:50 Diamond Stripping Foils for the SNS – R.W. Shaw (ORNL) and C.S. Feigerle (U. of Tennessee)

10:50-12:15 Working session on foil issues

12:15-01:30 Lunch

Collimation & jitter correction

01:30-01:50 Transport line collimation – A. Drozhdin (Fermilab)

01:50-02:10 Energy jitter correction requirement – J. Wei (BNL)

02:10-02:30 Simulation of 8 GeV H^- beams – P. Ostroumov (ANL)

02:30-02:50 Energy jitter correction – J. MacLachlan (Fermilab)

02:50-03:10 Working session on collimation and jitter correction

03:10-03:40 Coffee break

03:40-04:10 Working session on collimation and jitter correction (cont'd)

04:10-05:30 General discussion and conclusions

05:30 Adjourn