Schedule and Parameters for Nsrl6 and NASA Runs

C.J. Gardner

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Caution! The following schedule is subject to change. Please note release date above.

NSRL is to begin taking beam on 7 June 2005; NASA (AGS) on 27 June.

Beam Order (with nominal Booster Extraction energy):

1. Protons. 1000 MeV. June 7–8 (Tue–Wed).
2. Titanium. 1000 MeV per nucleon. June 9–10 (Thur–Fri).
3. Titanium. 1000 MeV per nucleon. June 13–15 (Mon–Wed).
4. Iron. 300 MeV per nucleon. June 15–16 (Wed–Thur).
5. Iron. 1000 MeV per nucleon. June 17 (Fri).
6. Iron. 1000 MeV per nucleon. June 20–24 (Mon–Fri).
7. Iron. 1000 MeV per nucleon. June 27–29 (Mon–Wed).
8. Iron. 300 MeV per nucleon. June 30–July 1 (Thur–Fri).
9. **Iron to AGS**. 278.3 MeV per nucleon. June 27–July 1 (Mon–Fri).
10. **Carbon to AGS**. 363.8 MeV per nucleon. July 2–4 (Sat–Mon).
11. **Silicon to AGS**. 437.6 MeV per nucleon. July 5–8 (Tue–Fri).
12. Silicon. 300 MeV per nucleon. July 5–6 (Tue–Wed).
13. Silicon. 1000 MeV per nucleon. July 7–8 (Thur–Fri).

Protons (from Linac) for NSRL will be set up on BU2. All other ions for NSRL will be set up on BU3. Ions for AGS will be setup on BU1 and AU1. Measured BU1 extraction field should be 5228.6 Gauss. Use BTA foil 2.

Table 1: Proton, Titanium, and Iron Parameters at Booster Injection

Parameter	Proton	Ti^{18+}	Fe^{20+}	Unit
mc^2	0.938271998	44.6540277	52.0928437	GeV
Date	28 Mar 05	–	6 Apr 05	
11DH1 NMR Probe	Linac	4364.1	4364.1	Gauss
hf	843.100	358.056	341.131	kHz
h	1	3	3	
$T = 1/f$	1.18609892	8.3786	8.79427	μs
Kinetic Energy W	201.237574	144.7817	153.2415	MeV
$B\rho$	2.156918716	0.6669	0.6669	Tm
$B\rho/\rho$	1555.589889	480.974	480.974	Gauss
Booster Hall Probe	453.3	–	453.4	Gauss
Booster Gauss Clock	1101.7	–	23.5	Gauss
Injection Field H	1555.0	476.9	476.9	Gauss
Inflector Setpoint V_S	Linac	–	29.781	kV
Inflector Predicted V_I	Linac	31.235	29.759	kV

Table 2: Carbon and Silicon Parameters at Booster Injection

Parameter	C^{5+}	C^{6+}	Si^{13+}	Unit
mc^2	11.17537316	11.17486216	26.05369658	GeV
Date	–	–	–	
11DH1 NMR Probe	4364.1	4364.1	4364.1	Gauss
hf	397.121	475.736	442.455	kHz
h	3	3	3	
$T = 1/f$	7.5544	6.3060	6.7804	μs
Kinetic Energy W	44.6215	64.2018	129.322	MeV
$B\rho$	0.6669	0.6669	0.6669	Tm
$B\rho/\rho$	480.974	480.974	480.974	Gauss
Booster Hall Probe	–	–	–	Counts
Booster Gauss Clock	–	–	–	Counts
Injection Field H	476.9	476.9	476.9	Gauss
Inflector Setpoint V_S	–	–	–	kV
Inflector Predicted V_I	34.643	41.501	38.598	kV

Table 3: Proton and Titanium Parameters at Booster Extraction

Parameter	Proton	Ti^{18+}	Unit
mc^2	0.938271998	44.6540277	GeV
Date	–	13 Nov 03	
hf	1.300060	3.9105	MHz
h	1	3	
$T = 1/f$	0.769195	0.76717	μs
Kinetic E per Nucleon	1000.0000	1008.3523	MeV
$B\rho$	5.65737292	15.12915494	Tm
$B\rho/\rho$	4080.15	10911.29	Gauss
Magnetic Field Setpoint	4159	11100	Gauss
Calculated MM Current	1679	4490	Amps
MM Current Setpoint	1710	4663	Amps

Table 4: Iron Parameters at Booster Extraction

Parameter	Fe^{20+}	Fe^{20+}	Fe^{20+}	Unit
mc^2	52.0928437	52.0928437	52.0928437	GeV
Date	28 Mar 04	–	–	
hf	3.907680	2.916832	2.8453473	MHz
h	3	3	3	
$T = 1/f$	0.76772	1.02851	1.05435	μs
Kinetic E per Nucleon	1003.6298	300.0	278.2537	MeV
$B\rho$	15.83497291	7.51918795	7.205	Tm
$B\rho/\rho$	11420.33	5422.91	5200.55	Gauss
Magnetic Field Setpoint	11600	5519	5294	Gauss
Calculated MM Current	4700	2232	2140	Amps
MM Current Setpoint	4934	2271	–	Amps

Table 5: Carbon and Silicon Parameters at Booster Extraction

Parameter	C^{5+}	Si^{13+}	Si^{13+}	Unit
mc^2	11.17537316	26.05369658	26.05369658	GeV
Date	–	–	–	
hf	3.0975535	3.2675331	2.9165665	MHz
h	3	3	3	
$T = 1/f$	0.968506	0.918124	1.028607	μs
Kinetic E per Nucleon	363.8204	437.5521	300.0	MeV
$B\rho$	7.205	7.205	5.784686256	Tm
$B\rho/\rho$	5200.55	5200.55	4171.97	Gauss
Magnetic Field Setpoint	5294	5294	4252	Gauss
Calculated MM Current	2140	2140	1717	Amps
MM Current Setpoint	–	–	1749	Amps

Table 6: Carbon6 and Silicon Parameters at Booster Extraction

Parameter	C^{6+}	Si^{13+}	Si^{13+}	Unit
mc^2	11.17486216	26.05369658	26.05369658	GeV
Date	–	–	–	
hf	3.375748	3.2675331	2.9165665	MHz
h	3	3	3	
$T = 1/f$	0.888692	0.918124	1.028607	μs
Kinetic E per Nucleon	494.8085	437.5521	300.0	MeV
$B\rho$	7.205	7.205	5.784686256	Tm
$B\rho/\rho$	5200.55	5200.55	4171.97	Gauss
Magnetic Field Setpoint	5294	5294	4252	Gauss
Calculated MM Current	2140	2140	1717	Amps
MM Current Setpoint	–	–	1749	Amps

Table 7: Silicon Parameters at Booster Extraction

Parameter	Si^{13+}	Si^{13+}	Si^{13+}	Unit
mc^2	26.05369658	26.05369658	26.05369658	GeV
Date	–	–	–	
hf	3.90543215	3.2675331	2.9165665	MHz
h	3	3	3	
$T = 1/f$	0.768161	0.918124	1.028607	μs
Kinetic E per Nucleon	1000.0	437.5521	300.0	MeV
$B\rho$	12.1520979	7.205	5.784686256	Tm
$B\rho/\rho$	8771.36	5200.55	4171.97	Gauss
Magnetic Field Setpoint	8911	5294	4252	Gauss
Calculated MM Current	3610	2140	1717	Amps
MM Current Setpoint	3680	–	1749	Amps

Table 8: Iron, Carbon, and Silicon Parameters at Ags Injection (with C^{5+} at Booster Extraction)

Parameter	Fe^{26+}	C^{6+}	Si^{14+}	Unit
mc^2	52.08977771	11.17486216	26.05318558	GeV
Date	–	–	–	
hf	2.84534727	3.09755346	3.2675331	MHz
h	12	12	12	
$T = 1/f$	4.21741	3.874025	3.67250	μs
Kinetic E per Nucleon	278.2373	363.8038	437.5435	MeV
$B\rho$	5.54198149	6.00389212	6.69022592	Tm
$B\rho/\rho$	649.11	703.21	783.60	Gauss
Magnetic Field Setpoint	648.26	702.34	782.70	Gauss

Table 9: Iron, Carbon, and Silicon Parameters at Ags Injection (with C^{6+} at Booster Extraction)

Parameter	Fe^{26+}	C^{6+}	Si^{14+}	Unit
mc^2	52.08977771	11.17486216	26.05318558	GeV
Date	–	–	–	
hf	2.84534727	3.37574799	3.2675331	MHz
h	12	12	12	
$T = 1/f$	4.21741	3.55477	3.67250	μs
Kinetic E per Nucleon	278.2373	494.8085	437.5435	MeV
$B\rho$	5.54198149	7.205	6.69022592	Tm
$B\rho/\rho$	649.11	843.89	783.60	Gauss
Magnetic Field Setpoint	648.26	842.98	782.70	Gauss

Table 10: Iron, Carbon, and Silicon Parameters at Ags Extraction

Parameter	Fe^{26+}	C^{6+}	Si^{14+}	Unit
mc^2	52.08977771	11.17486216	26.05318558	GeV
Date	–	–	–	
hf	4.3307363	4.3473002	4.3474750	MHz
h	12	12	12	
$T = 1/f$	2.77089	2.76033	2.76022	μs
Kinetic E per Nucleon	3.0000	3.2851	3.2857	GeV
$B\rho$	27.434	27.434	27.434	Tm
$B\rho/\rho$	3213.23	3213.23	3213.23	Gauss
Magnetic Field Setpoint	3211.60	3211.60	3211.60	Gauss

Table 11: Iron, Carbon, and Silicon Parameters at Ags Extraction

Parameter	Fe^{26+}	C^{6+}	Si^{14+}	Unit
mc^2	52.08977771	11.17486216	26.05318558	GeV
Date	–	–	–	
hf	4.4022012	4.4095727	4.4096503	MHz
h	12	12	12	
$T = 1/f$	2.72591	2.72135	2.72130	μs
Kinetic E per Nucleon	5.0000	5.4445	5.4451	GeV
$B\rho$	42.078	42.078	42.078	Tm
$B\rho/\rho$	4928.42	4928.42	4928.42	Gauss
Magnetic Field Setpoint	4926.28	4926.28	4926.28	Gauss

Table 12: Iron, Carbon, and Silicon Parameters at Ags Extraction

Parameter	Fe^{26+}	C^{6+}	Si^{14+}	Unit
mc^2	52.08977771	11.17486216	26.05318558	GeV
Date	–	–	–	
hf	4.4412052	4.4433905	4.4434134	MHz
h	12	12	12	
$T = 1/f$	2.70197	2.70064	2.70063	μs
Kinetic E per Nucleon	10.0000	10.8340	10.8347	GeV
$B\rho$	78.243	78.243	78.243	Tm
$B\rho/\rho$	9164.27	9164.27	9164.27	Gauss
Magnetic Field Setpoint	9160.86	9160.86	9160.86	Gauss

Table 13: Longitudinal Emittance and Bucket Area in Booster at Injection. Emit is the emittance of the beam in one bucket assuming $\Delta p/p = \pm 0.00025$. A_S is the stationary bucket area at the indicated gap voltage. The units are eV-s. Note that if the gap voltage is 30 kV and $dB/dt = 80$ G/ms, then the stable phase is 48.25 degrees and the bucket area is αA_S where $\alpha = 0.135$.

Ion	Emit	A_S 0.5 kV	A_S 30 kV
Ti^{18+}	0.404	2.711	21.0
Fe^{20+}	0.449	3.085	23.9
C^{5+}	0.112	0.716	5.54
Si^{13+}	0.292	1.764	13.7