EXPERIMENT : Test of Stack-Tail Cooling with Design Flux of Protons. Second round.

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Introduction

The method and intent of this experiment are well described in ME Note n° 41. The main difference (of which we are aware) is that the stack tail now has an improved noise figure - cold resistors and new amplifiers.

Method

The number of injected protons was measured with the program (VDM) INJM. (To keep the spectrum analyzer from saturating the reference level was changed to 2 mV). For a typical pulse it was found : 2.41×10^7 protons injected, 2.14×10^7 after precooling, and 0.33×10^7 left on the precooling orbit after r.f. stacking. Therefore, 1.81×10^7 were moved to the stacking orbit.

The number of injected protons seemed to be stable but was not measured pulse by pulse. The magnet currents for the injection line are shown in Table I. The r.f. program is shown in Table II. The status of the cooling systems is shown in Table III. Some of the precooling amplifiers were not working (according to the computer) as shown in Table III.

The stack tail system was gated for 2 s/injected pulse or alternatively run ungated. The high frequency system was always ungated. The AA took 1/6 PS cycles. Stack tail horizontal and vertical systems were off.

Results

The stacking rate is shown in Fig. 1. With the stack tail system gated, 95% of the 1.8×10^7 protons deposited are cooled into the stack tail. In the gated mode 64% of the protons are cooled into the stack tail. Recall that about 20% were lost in the precooling process. The gated stacking rate is equivalent to 1.8×10^{10} per hour for 6/6 PS pulses. This rate can be compared to rates reported in ME n° 41: 1.26×10^7 with a 340 Hz r.f. bucket and 0.93×10^7 with 625 Hz bucket.

Conclusion

It is possible to stack 1.8×10^{10} particles per hour with the current stack tail system. As usual, we must add the caveat that the performance could possibly have been better if more time were available for optimization.

Reported by J. Marriner

TABLE I

1983-03-16-06:24:07 INJECTION BEFORE TARGET. PROTON

		REF.	REQUIRED	MEAS.	
QDE0005	⋈	267.2	32.3	0	OFF
BTI0010	BT	360.9	45.3	45.2	ON
QF00015	◇	336.7	28.0	28.0	ON
DVT0025	V	12.8	3.1	3.1	ON
QDE0030	⋈	354.9	38.9	38.9	ON
QF00035	◇	118.9	33.3	33.2	ON
BVT0040	BV	375.2	48.5	48.4	ON
DHZ0045	H	-30.8	-14.7	-14.7	ON
QF00050	◇	1881	0	0	OFF
QDE0052	⋈	3600	1869	159	OFF
QF00055	◇	1100	298	0	OFF

1983-03-16-06:24:50 INJECTION AFTER TARGET, PROTONS

		REF.	REQUIRED	MEAS.	
QDE0070	◇	244.7	244.6	0	OFF
QF00071	⋈	231.2	231.2	0	OFF
BHZ0072	BH	346.8	346.7	346.7	ON
QDE0075	◇	120.3	120.3	0	OFF
QF00080	⋈	76.48	76.48	0	OFF
DHZ0081	H	3.1	3.0	3.0	ON
QF00085	⋈	64.68	64.68	.01	OFF
DVT0089	V	0	0	0	ON
QDE0090	◇	99.89	99.89	0	OFF
DHZ0094	H	7.0	6.9	6.9	ON
QF00095	⋈	73.44	143.44	143.40	ON
DVT0096	V	.79	.78	.79	ON

TABLE II

1 STACKING FUNCTION - FAST DEPOSIT 83-03-15 83-03-1

*0 PHASE LOCK

→ 1Hz=.0091[illegible] [illegible]

			VALUES AT END OF SEQUENCE				
SEQUENCE	TYPE	Δt	t-FPA	t	A Hz	Γ	
INITIAL			2.49	1846.1	23	0	5
1	TRP	.18	2.67	1846.1	620	0	339[illegible]
2	MAT	.03	2.7	1850.01	620	-.3	11[illegible]1
3	MOV	.004	2.704	1851.6	620	-.3	11[illegible]
4	DEP	.079	2.784	1852.18	13	-.3	5
5	DHS	.01	2.794	1846.1	23	0	5

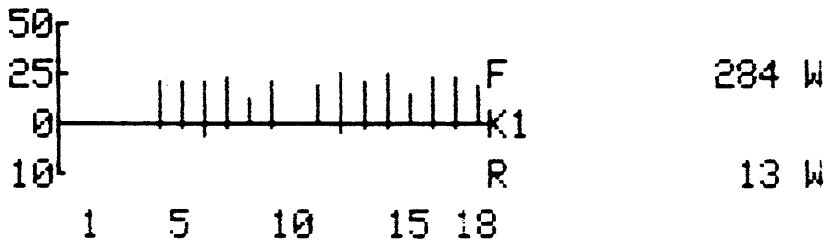
STACK TAIL COOLING, DP/P **TABLE III** 1983-03-16-06:30:43

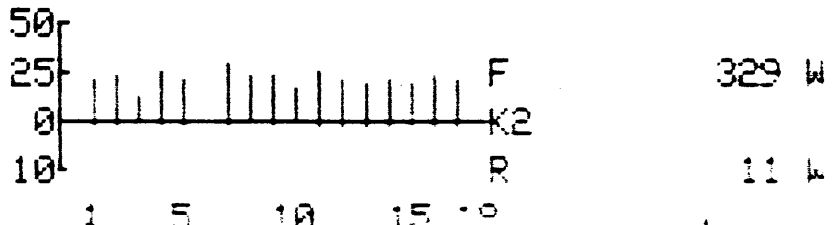
	S1	S2	
ATTENUATOR	1	3	dB
DELAY	.3	.7	ns
LINES 1		513	mm
2		489	mm
3		489	mm
4		491	mm
5		491	mm

PU1 (S1)	ON
PU2 (S2)	ON
PU3 (S2)	ON
PU4 (S1)	ON

SYSTEM	ON
SP.ANAL.	?
TEST	OFF
POW.SUPPLY	
RACK 0023	ON
RACK 1206	ON
RACK 1805	ON

POWER NOW		W
AT LAST TRIGGER	613	W
TRIGGER AT	3100	ms





PRECOOLING 1983-03-16-06:23:27

ATTENUATOR	0	dB
DELAY (COM)	1	ns
DELAY (K2)	1.2	ns
LINE	492	mm

PU1.1	ON
PU1.2	ON
PU1.3	ON
PU2.1	ON
PU2.2	ON
PU2.3	ON
K1	ON
K2	ON

SYSTEM	ON
SP.ANAL.	?
TEST	OFF
POW.SUPPLY	
RACK 0023	ON
RACK 0503	ON
RACK 1805	ON
SHUTTERS	RUNNING

POWER NOW		W
AT LAST TRIGGER	2899	W
TRIGGER AT	700	ms

% = OFF (VOLTAGE ALARM)