

The AGS Booster heavy ion operation

Y. Y. Lee

September 1986

Collider Accelerator Department
Brookhaven National Laboratory

U.S. Department of Energy
USDOE Office of Science (SC)

Notice: This technical note has been authored by employees of Brookhaven Science Associates, LLC under Contract No.DE-AC02-76CH00016 with the U.S. Department of Energy. The publisher by accepting the technical note for publication acknowledges that the United States Government retains a non-exclusive, paid-up, irrevocable, world-wide license to publish or reproduce the published form of this technical note, or allow others to do so, for United States Government purposes.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

THE AGS BOOSTER HEAVY ION OPERATION

Booster Technical Note
No. 61

Y. Y. LEE
SEPTEMBER 3, 1986

ACCELERATOR DEVELOPMENT DEPARTMENT
Brookhaven National Laboratory
Upton, N.Y. 11973

THE AGS BOOSTER HEAVY ION OPERATION

Y. Y. Lee
September 3, 1986

In this note we propose a mode of the AGS and the Booster operation. It has been decided the transfer line between the Booster and the AGS shall be capable of transporting the beam of 11 tesla-meter of magnetic rigidity which corresponds to 2.5 GeV proton. The line is not capable of transport lighter ion species if they are accelerated to the full capability of the Booster of 17.58 T-m. Therefore, we should decide the energy of the each species compatible with the capability of together components of the system. the proton in the Booster nominally accelerate to 7.51 T-m, and the final magnetic rigidity of gold ion is 17.58 T-m in the Booster and 7.343 T-m in the AGS after stripping. A mode of operation we would like to propose is that all heavy ions to be accelerated to magnetic rigidity in the AGS to 7.343 Testa-meter. The energy is high enough to give better than or equal to 50% stripping efficiency for the gold and over 90% for iodine or lower ion species. The magnetic and RF parameters for this scheme is given in the table. The RF parameter in the table is consistent with the Booster Tech Note 52. The times in the table are from start of the RF turn on for the bunching. The times are approximate, but may be useful to calculate the duty factors of the equipment. Also given are RF bunching voltage for .05 eV-sec/amu/bucket and RF accelerating voltage required to run the program of the Booster Tech. Note 52 and above mentioned program. The numbers for proton are given for comparison.

TABLE

	Au	I	Cu	S	C	P
B _p (AGS)			7.343			7.51
B _p (BOOSTER)	17.58	13.42	10.14	8.39	7.343	7.51
B (K-G)	12.8	9.8	7.4	6.1	5.3	5.5
K.E./amu MeV	350.	375.	431.	508.	508.	1500.
f(RF) MHz	3.054	3.118	3.246	3.392	3.392	4.114
B(inj)	.628	.591	.546	.522	.577	1.563
B(.69MHz)	2.13	1.56	1.08	.81	.71	----
B(2.4MHz)	8.68	6.37	4.44	3.32	2.91	----
T(.69MHz)ms	68.	54.	44.	23.	21.	----
T(2.4MHz)ms	316.	297.	273.	236.	235.	----
V(bunch) KV	.877	.642	.445	.332	.288	----
V(acc) KV	14.6	9.9	8.6	6.7	5.7	----