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Standardization of nomenclature and identification symbols for the beam transport lines external to the AGS accelerator

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STANDARDIZATION OF NOMENCLATURE AND IDENTIFICATION SYMBOLS FOR THE BEAM TRANSPORT LINES EXTERNAL TO THE AGS ACCELERATOR

The purpose of this note is to establish guidelines for the identification of components in all beam transport lines of the AGS Accelerator system.

I. Beam Lines

The list of primary beam lines assigned at the present time is presented in Table I.

Table I

Primary Beam Lines

Item #	Beam Line	Description	Location
1	A	SEB - Slow External Beam	AGS East Experimental Area
2	B	" " " "	" " "
3	C	" " " "	" " "
4	D	" " " "	" " "
5			
6	M	Medical Beam Line	Linac
7	N	HEBT - High Energy Beam Transport, normal injection	Linac - the beam line between linac and AGS Ring.
8	P	BLIP - Brookhaven Linac Isotope Producer	Linac
9	Q	Chemistry Beam Line	Linac
10	U	FEB - Fast External Beam Neutrino Beam	AGS - North Experimental Area

The list of secondary beam transport lines presently assigned to various experiments is shown in Table II. In general, every secondary beam line is identified by the letter of its parent primary line followed by a numeral. Exception - W line.

Table II

Secondary Beam Lines

Item #	Beam Line	Description	Location
1	A1	HEUB - High Energy Unseparated Beam - MPS Branch	AGS - East Experimental Area
2	A2	Test Beam	" " "
	A3	HEUB-Branch #2	
3	B1	0^{o} Charged Particle Beam	" EEBA (Extension of East Building Area)
4	B2	MESB - Medium Energy Separated Beam - MPS Branch	" " " "
5	B4	MESB - Medium Energy Separated Beam - Branch #2	" " " "
6	B5	High Energy Neutral Beam	" " " "
7	C1	High Energy Proton & Pion Beam	" " " "
8	C2	LESB - Low Energy Separated Beam - Branch #1	" " " "
9	C3	HYPERON Beam	" " " "
10	C4	LESB - Low Energy Separated Beam - Branch #2	" " " "
11	D1	Neutral Beam	" - East Experimental Area
12	W	FEB - 7 Ft. Bubble Chamber Line	" - North Experimental Area

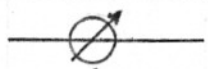
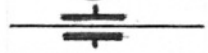
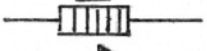
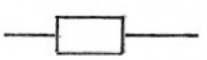
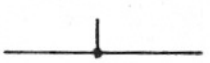
II. Beam Component Designation

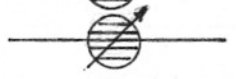
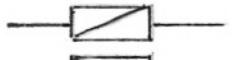
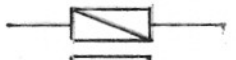
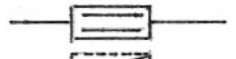
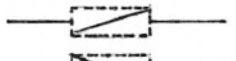
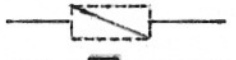
A. Component Description

The transport and diagnostic equipment in all beam lines shall be identified by a code letter and shall be shown on all drawings or sketches by its proper symbol. These are shown in Table III.

Table III

Beam Line Equipment Codification

Item	Code Letter	Drafting Symbol	Description
1	A		Beam Attenuator
2	B		Beam Separator
3	C		Collimator - Slit - Horizontal
4	C		" " - Vertical
5	D		Dipole - Polarity A - see Note #3
6	D		" " B " #4
7	D		Superconducting Dipole - Polarity A - see Note #3
8	D		" " " B - " #4
9	D		Dipole - Septum Magnet - Polarity A - " #3
10	D		" " " B - " #4
11	D		" - Beam Splitter - Polarity A - " #3
12	D		" " " B - " #4
13	D		" - Steering Magnet
14	E		SEC - Secondary Emission Chamber
15	F		Flag in Air
16	F		" " Vacuum
17	G		Gauge - Thermocouple
18	G		" - Bourdon
19	G		" - Ionization
20	G		" - Pressure
21	H		
22	I		Instrument Box
23	J		General - Special Purpose (one of a kind) Device
24	K		
25	L		Monitor - Loss, Radiation
26	L		" - Heat
27	M		Vacuum Pump - Mechanical
28	M		" - Ion
29	M		" - Turbo Molecular
30	N		

Item	Code Letter	Drafting Symbol	Description
31	O		
32	P		Dipole - Pitching Magnet - Polarity A - See Note #5
33	P		" " " B - " #6
34	Q		Quadrupole - Polarity A - See Note #7
35	Q		" - " B - " #8
36	Q		Superconducting Quad - Polarity A, See Note #7
37	Q		" " - " B, " #8
38	R		Radio-Frequency Device
39	S		Sextupole - Polarity A, See Note #9
40	S		" " B, " #10
41	T		Target
42	T		Target, Retractable
43	U		
44	V		Valve - Hand Operated
45	V		" - Pneumatic
46	V		" - Automatic
47	V		" - Solenoid
48	V		" - Vent
49	W		SWIC - Segmented Wire Ionization Chamber - Fixed
50	W		" " " " - Retractable
51	W		Scanning Wire Profile Monitor
52	X		Transformer
53	Y		STIC - Position Monitor - Horizontal & Vertical - In Vacuum
54	Y		" " Horizontal Only - In vacuum
55	Y		" " Vertical Only "
56	Y		" " Share "
57	Y		" " Horizontal Only - In Air
58	Y		" " Vertical Only "
59	Z		Beam Stop - Plug
60			Beam Pipe Window

B. Major Components in Beam Lines

Major beam transport components such as bending magnets, quadrupole magnets, sextupole magnets, beam separators and collimators shall be designated by the beam line identification symbol, equipment code letter and a single digit number.

The single digit number shall indicate sequential position of the component with respect to a reference point and to other components of the same function.

Example: CQ2 means second quadrupole magnet downstream of F13 zero reference point in the C beam line.

C1Q3 means third quadrupole magnet downstream of target C in the C1 beam line.

C. Auxiliary Beam Components

All auxiliary beam transport components and diagnostic equipment shall be designated by the beam line identification symbol, equipment code letter and a three digit number. The three digit number shall indicate the distance in feet (rounded to the nearest integer) between the component and the zero reference point for the primary beam lines and between the component and the primary beam target for the secondary beam lines.

1. Primary Beam Line

Transport and diagnostic auxiliary equipment in the primary beam lines shall be identified by an alphanumeric symbol consisting of two letters and a three digit number.

Example: CPO33 means pitching magnet in C line located 33 feet downstream of the F13 zero reference point.

2. Secondary Beam Line

The auxiliary beam components in the secondary beam lines shall follow the same designation as in primary beam lines with the exception that they shall be composed of six alphanumeric characters, since the beam line utilizes a letter and a digit identification code.

Example: C1W123 means SWIC in C1 line located 123 feet downstream of the primary target C.

The above guidelines shall be in force as of this note and must be adhered to henceforth. Discrepancies should be corrected and documentation updated as soon as possible. These guidelines shall be reviewed and brought

up-to-date at yearly intervals.

The authors would like to solicit recommendations, suggestions and observations pertaining to the upgrading and perfecting of this standardization program.

III. Notes

1. It is assumed that all beams consist of positively charged particles.

2. The direction of beam bend shall always be relative to the observer traveling with the beam.

3. The polarity A for a dipole magnet shall be defined as the polarity of a magnetic field that induces a positive bend in a horizontal plane. A positive horizontal bend is towards the AGS ring.

4. The polarity B for a dipole magnet shall be defined as the polarity of a magnetic field that induces a negative bend in a horizontal plane, i.e. bend away from the AGS ring.

5. The polarity A for a pitching magnet shall be defined as the polarity of a magnetic field that induces a positive bend in a vertical plane. A positive vertical bend is upward.

6. The polarity B for a pitching magnet shall be defined as the polarity of a magnetic field that induces a negative bend in a vertical plane, i.e. downward bend.

7. The polarity A for a quadrupole magnet shall be that which produces focusing forces on the beam particles in a horizontal plane.

8. The polarity B for a quadrupole magnet shall be that which produces focusing forces on the beam particles in a vertical plane.

9. The polarity A for a sextupole magnet shall be that which produces a horizontal bend towards the AGS ring on off-axis particles.

10. The polarity B for a sextupole magnet shall be that which produces a horizontal bend away from the AGS ring on off-axis particles.

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