STORAGE RING STUDY

Triplet Lattice T1

Brief Description: A 333 meter radius separated function lattice. The 52 meter long cells are made up of four closely placed quadrupoles, acting as a double-focusing triplet lens, followed by eight four-meter bending magnets. The ring has two head-on interaction regions and two injection regions, each requiring three modified cells. This lattice could be used either for concentric or tangent rings.

The interacting-injection sections are matched to the normal cells with respect to both betatron and synchrotron oscillations. The off momentum orbits are parallel but not coincident in the interaction region ($x_p \neq 0$, $x'_p = 0$), so that luminosity is diminished compared to an $x_p = 0$ interaction region. However, the interaction region has the following interesting property:

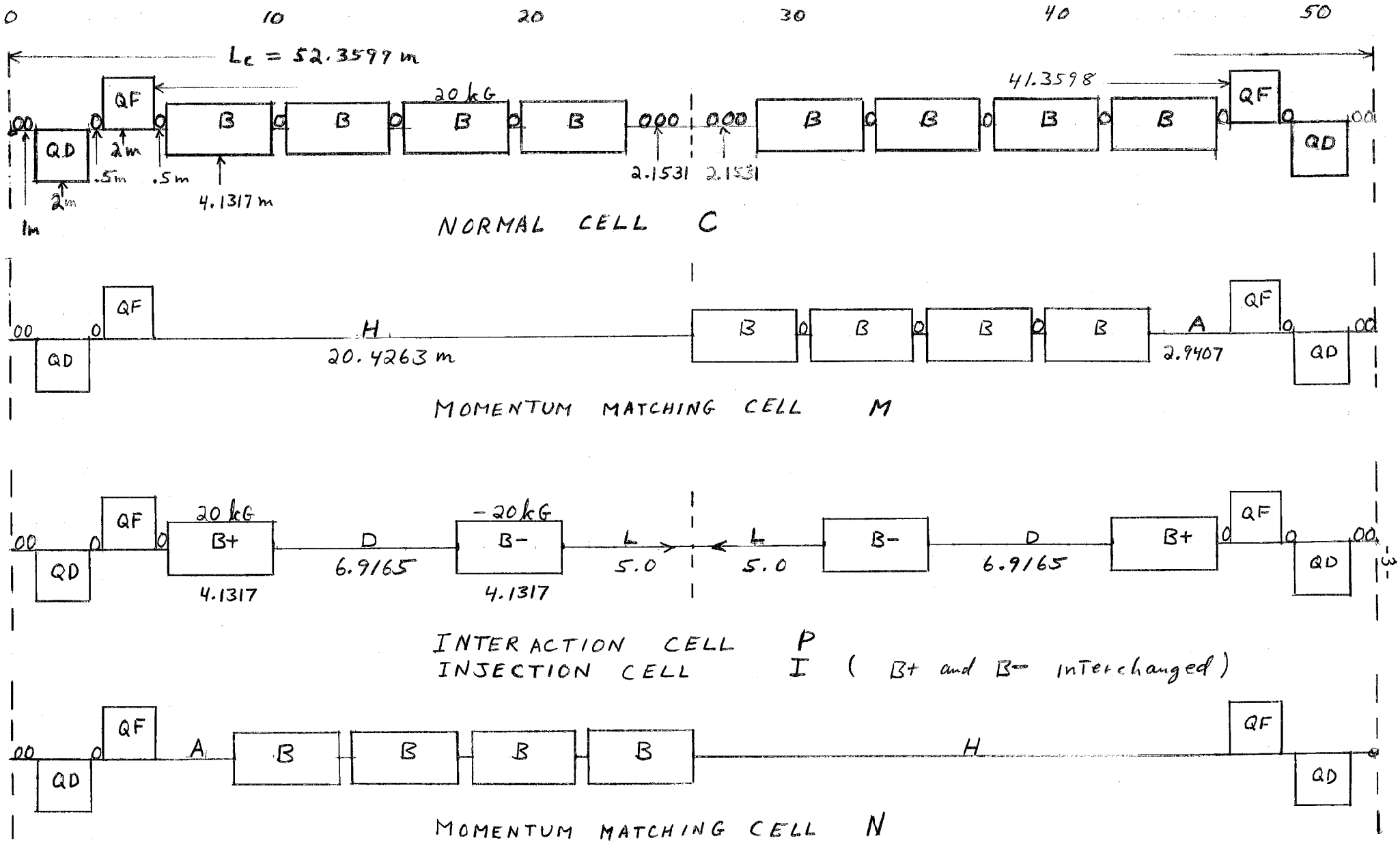
The high momentum particles of one beam will be coincident with the low momentum beam of the other. Hence the total center of mass energy is constant for all collisions between particles with zero betatron radial amplitude. In other words, the energy resolution of the experiments is not impaired by stacking beams in momentum space.

Principal Parameters

Kinetic energy	E	100	BeV
Radius	R	333.33	m
Betatron frequency	ν	13.75	
Magnetic field	B	20	kG
Magnetic radius	ρ	168.34	m
No. superperiods	N_s	2	
No. interaction regions		2	
No. injection regions		2	
No. cells		40	
Cell length	L_c	52.36	m
No. bending magnets		320	
Length of bending magnets		4.1317	m
Bending angle per magnet		.024544	rad
No. beam combination magnets		2 x 4 =	8
No. beam separation magnets		2 x 4 =	8
Quadrupoles		160	
Length of quadrupoles		2	m
Gradient in F quadrupoles		+237.89	kG/m
Gradient in D quadrupoles		-220.59	kG/m
Length of interaction region		10.0	m
Beam separation (concentric case)		0.5423	m

Betatron Functions

	β_h	β_v	x_p	
QF	42	67	2.89	m
QD	24	102	2.22	m
B1	41	44	2.84	m
B2	24	22	2.17	m
Int. Region	16	15	0.27	m



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STORAGE RING ISR = S · S

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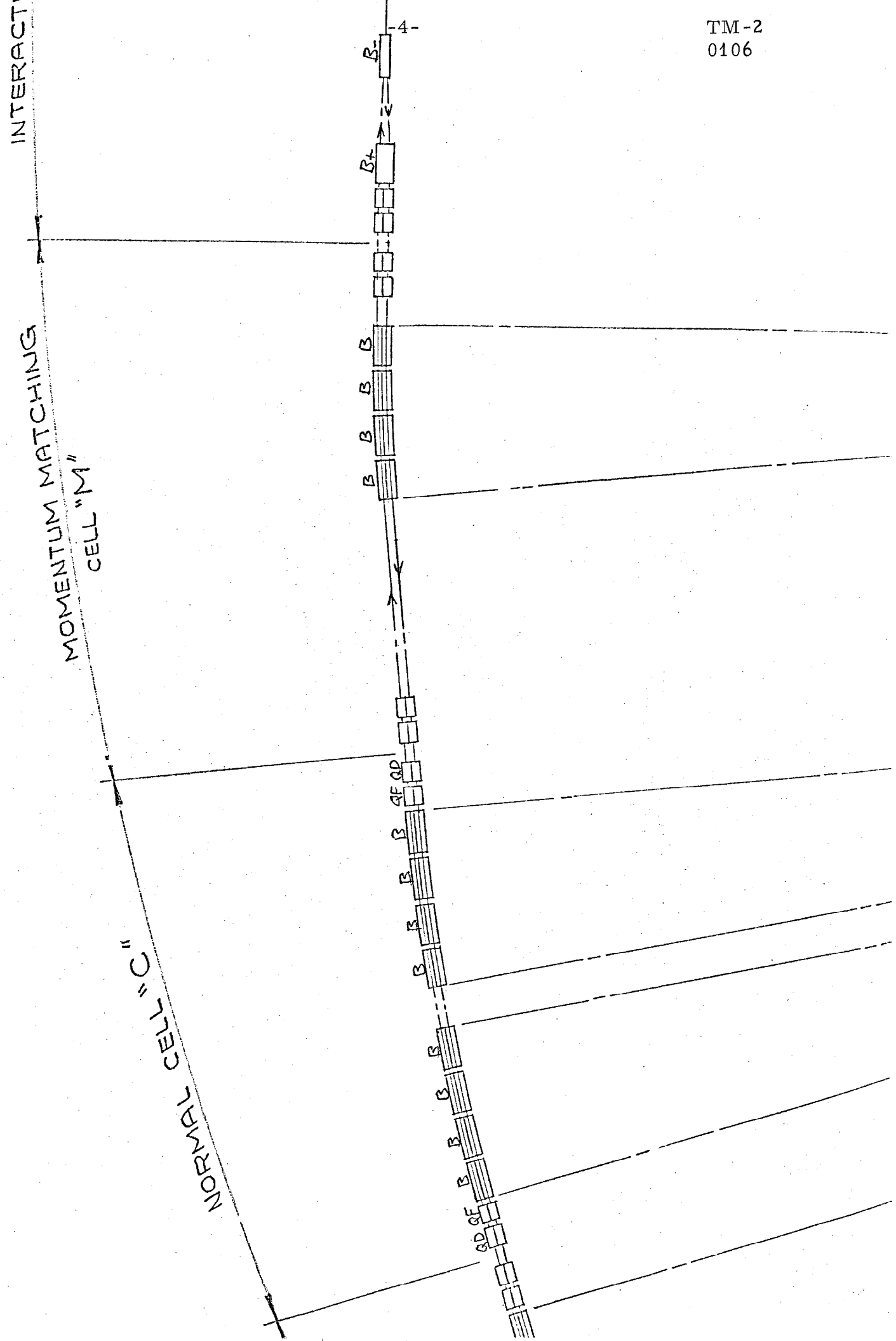
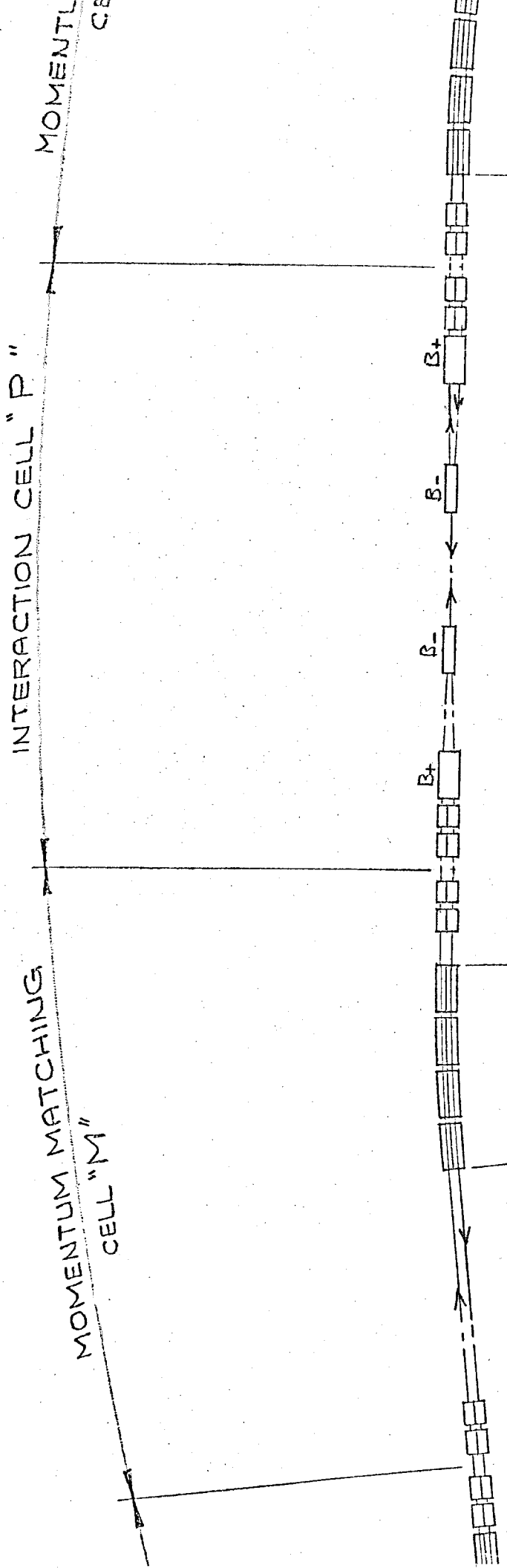
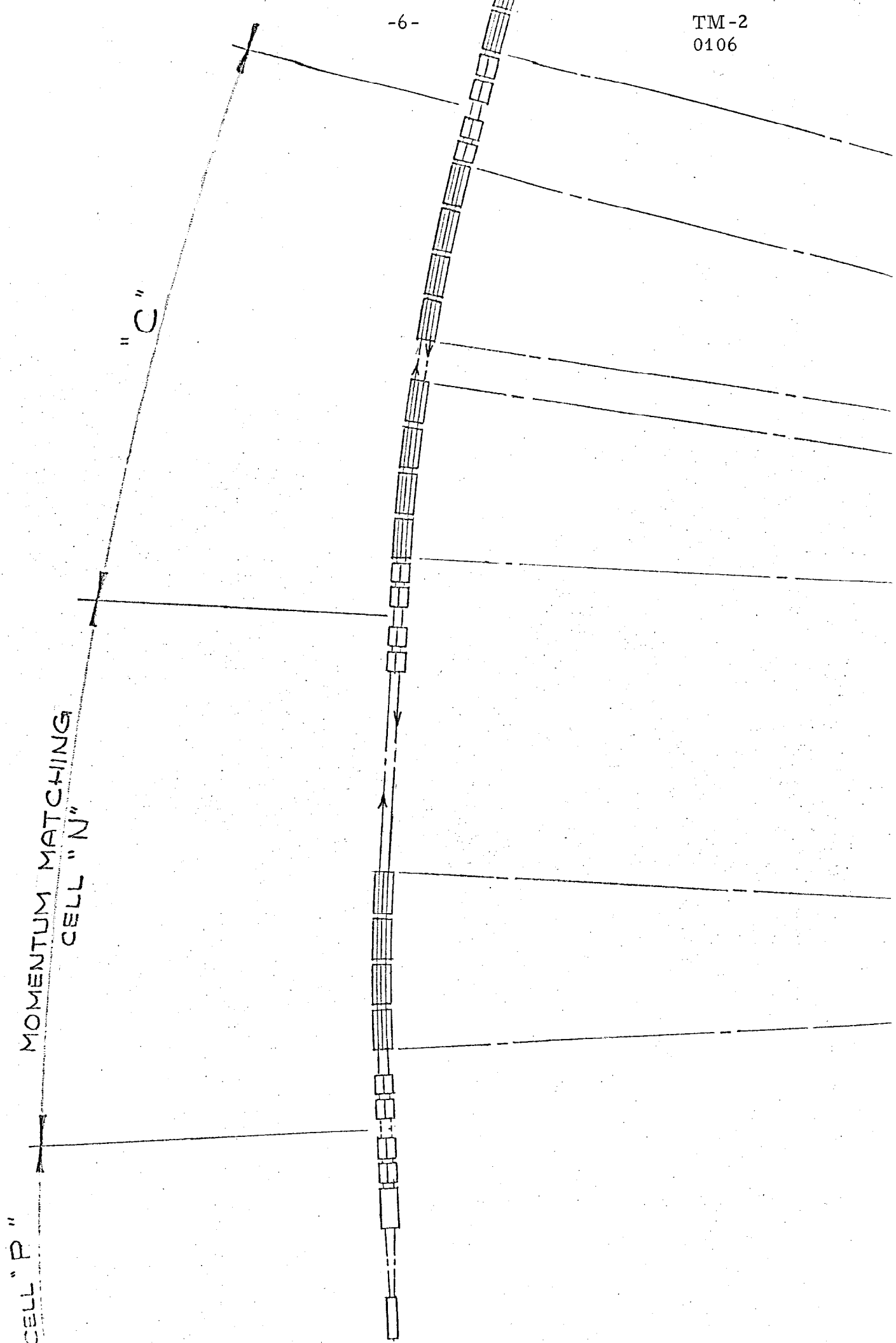

INTERACT
MOMENTUM MATCHING
CELL "M"
NORMAL CELL "C"
B-
B+
B
QF QD


MOMENTUM MATCHING
CELL "M"
INTERACTION CELL "P"
B+
B-
B-
B+


"C"
MOMENTUM MATCHING
CELL "N"
CELL "P"