



Squeeze Factor

- Agreement between J.C. Bau, B. Todd, S. Redaelli and J. Wenninger on a first implementation and distribution of the squeeze factors.
- Main point:
 - The timing system will be prepared to distribute the b^* values of the 4 Irs.
 - The generation of the b^* values is done by SIS. SIS sends its results directly to the LHC timing system.
 - Experience will be fed into the design of the 2011 SMP version (V3).
 - Collimator controls teams and other clients could test the use of b^* values for interlocks etc...

- Recipe from S. Redaelli to reconstruct β^* from 2 selected PC currents (see Evian proceedings).
- Implemented in SIS. The algorithm works for the squeeze at 3.5 TeV and along the ramp (within 0.1 m).

Table 6: Pairs of matching quadrupoles used to compute the β^* values from the current ratios.

IP	Ratio of magnet currents
IP1/IP5	RQ10-R5B2 / RQ7-L5B1
IP2	RQ5-L2B1 / RQ7-R2B2
IP8	RQ5-L8B1 / RQ7-R8B2

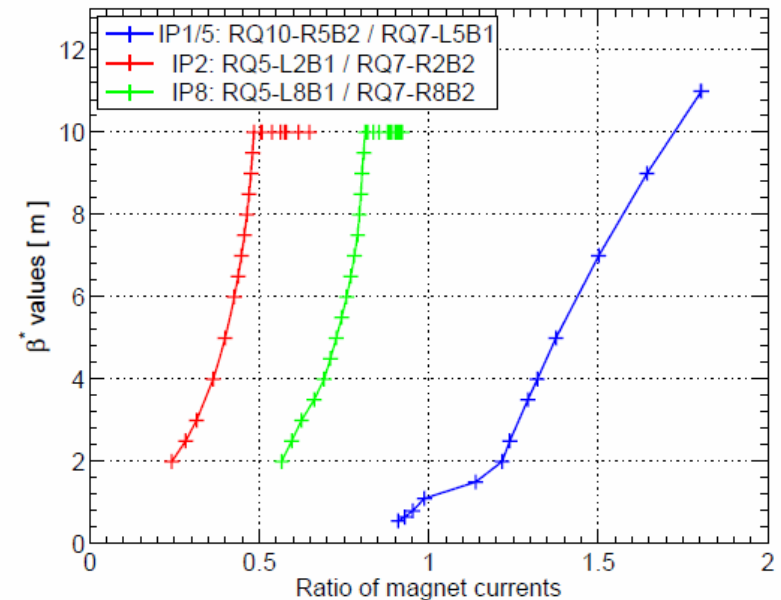


Figure 11: β^* in all IPs as a function of the current ratio of selected matching quadrupole pairs.

- Two new timing events + associated telegrams:
 - HX.BSTAR15-CTM IR1 and IR5 beta*
 - HX.BSTAR28-CTM IR2 and IR8 beta*
- Details:
 - Each b* factor is 8-bits, 0.1 m per step, giving a valid range of 0 to 25.6 m.
 - **We have only 2 telegrams available !**
 - Values will be updated whenever new information is received by the MTG from the SIS. Once every 2-4 seconds is adequate.
 - There is no fail-safe concept for these values presently, if nothing is written by the SIS, then the MTG's old value will still be valid.
- Present status:
 - everything is in place, except the link SIS → MTG.
 - >> could become operational sometimes next week !
 - To be added to the logging...

Telegram groups descriptions - Mozilla Firefox

http://wwwpsco.cern.ch/private/timing/timing/Seq/tgmGroups.htm?mode=OPER&net=LHC&mch=LHC

Telegram Groups Descriptions

Environment OPER.LHC
Machine LHC

GNum	Name	Type	Size	Min	Max	Default	Treatment	Description
1	SECTACC	BITPATTERN	8	0	255	0	OPERATOR	Sector access
2	BPNM	VALUE	16	1	65535	1	AUTO	Basic Period Number
3	BKNI	VALUE	16	0	35640	0	OPERATOR	Next injection RF bucket
4	RNGI	EXCLUSIVE	16	1	3	1	OPERATOR	Next injection ring
5	ENG	VALUE	16	0	65535	0	AUTO	Beam energy
6	INT1	VALUE	16	0	65535	0	AUTO	Beam intensity - Ring 1
7	INT2	VALUE	16	0	65535	0	AUTO	Beam intensity - Ring 2
8	SMP1	BITPATTERN	16	0	15	1	AUTO	Safe machine parameters - Ring 1
9	SMP2	BITPATTERN	16	0	15	1	AUTO	Safe machine parameters - Ring 2
10	BMODE	EXCLUSIVE	24	1	21	1	OPERATOR	What the LHC is doing
11	FILLN	VALUE	16	1	65535	1	OPERATOR	Fill number
12	BSTAR15	VALUE	16	0	65535	0	OPERATOR	Squeezing factors: 2x8bits, res=0,1/bit
13	BSTAR28	VALUE	16	0	65535	0	OPERATOR	Squeezing factors: 2x8bits, res=0,1/bit
14	PP60A	BITPATTERN	16	0	255	0	OPERATOR	Power permit 60 Amps
15	USER	EXCLUSIVE	1	1	1	1	AUTO	LHC user
16	AMODE	EXCLUSIVE	24	1	15	1	OPERATOR	Machine mode
17	SPCON	BITPATTERN	16	0	1	0	OPERATOR	Specific conditions
18	OMODE	BITPATTERN	16	0	511	0	OPERATOR	Operational mode
19	NIBNCH	VALUE	16	0	65535	0	AUTO	Next injected number of bunches
20	NIBSP	VALUE	16	0	65535	0	AUTO	Next injected bunch spacing
21	NIBIN	VALUE	16	0	65535	0	AUTO	Next injected bunch intensity
22	NIPTY	VALUE	16	0	65535	0	AUTO	Next injected particle type
23	C1BNCH	VALUE	16	0	65535	0	OPERATOR	Circulating number of bunches - Ring 1
24	C1BSP	VALUE	16	0	65535	0	OPERATOR	Circulating bunch spacing - Ring 1
25	C1BIN	VALUE	16	0	65535	0	OPERATOR	Circulating bunch intensity - Ring 1
26	C1PTY	VALUE	16	0	65535	0	OPERATOR	Circulating particle type - Ring 1
27	C2BNCH	VALUE	16	0	65535	0	OPERATOR	Circulating number of bunches - Ring 2
28	C2BSP	VALUE	16	0	65535	0	OPERATOR	Circulating bunch spacing - Ring 2
29	C2BIN	VALUE	16	0	65535	0	OPERATOR	Circulating bunch intensity - Ring 2
30	C2PTY	VALUE	16	0	65535	0	OPERATOR	Circulating particle type - Ring 2
31	OPTID	VALUE	16	0	65535	0	OPERATOR	Beam optics identifier