LCLS-II Technical Note

CSR Power in LCLS-II Bends

LCLS-II TN-15-31

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The short bunch in the bends will radiate coherently for wavelengths which are longer than the bunch length. At high repetition rate, this CSR power will be partially directed onto the vacuum chambers following each bend. The table below lists a rough estimate for the average CSR power at each bend for a 929-kHz bunch rate (upstream of the spreader kicker), and for a 1-kA peak current with 300 pC of bunch charge (24 micron rms bunch length after the 4th bend of the BC2 chicane). Note that the rate drops by 10 after the spread kicker. These are just estimates of the average power and do not include the continued CSR immediately after the bends. Note also that they are calculated only for bends which the short bunch (*i.e.*, *the* BC2 4th bend and beyond).

Table 1: Average CSR power for each LCLS-II bend which transports the short bunch.

Bend Magnet Name	Energy (GeV)	Bend Angle (mrad)	Bend Length (m)	Rate (Hz)	CSR Power (W)
Common Line					
BCX24	1.600	42.5	0.55	929	42.6
BCXDLU1	4.000	10.7	0.35	929	14.7
BCXDLU2	4.000	-10.7	0.35	929	14.7
BCXDLU3	4.000	-10.7	0.35	929	14.7
BCXDLU4	4.000	10.7	0.35	929	14.7
BRB1	4.000	24.5	1.00	929	36.0
BRB2	4.000	-24.5	1.00	929	36.0
BCXDLD1	4.000	10.7	0.35	929	14.7
BCXDLD2	4.000	-10.7	0.35	929	14.7
BCXDLD3	4.000	-10.7	0.35	929	14.7
BCXDLD4	4.000	10.7	0.35	929	14.7
HXR System					
BYSP1H	4.000	-3.8	0.60	93	0.9
BYSP2H	4.000	3.0	0.60	93	0.8
BXSP1H	4.000	5.5	1.00	93	1.3
BY1	4.000	-2.3	1.02	93	0.8
BY2	4.000	-2.3	1.02	93	0.8
BX31	4.000	8.7	2.62	93	2.5
BX32	4.000	8.7	2.62	93	2.5
BCX321	4.000	8.8	0.35	93	1.3
BCX322	4.000	-8.8	0.35	93	1.3
BCX323	4.000	-8.8	0.35	93	1.3

BCX324	4.000	8.8	0.35	93	1.3
BCX351	4.000	6.2	0.35	93	1.0
BCX352	4.000	-6.2	0.35	93	1.0
BCX353	4.000	-6.2	0.35	93	1.0
BCX354	4.000	6.2	0.35	93	1.0
BX35	4.000	-8.7	2.62	93	2.5
BX36	4.000	-8.7	2.62	93	2.5
BCX361	4.000	6.2	0.35	93	1.0
BCX362	4.000	-6.2	0.35	93	1.0
BCX363	4.000	-6.2	0.35	93	1.0
BCX364	4.000	6.2	0.35	93	1.0
SXR System					
BYSP1S	4.000	3.2	0.60	93	0.8
BYSP2S	4.000	-2.4	0.60	93	0.7
BXSP1S	4.000	-11.1	1.00	93	2.1
BXSP2S	4.000	-11.1	1.00	93	2.1
BXSP3S	4.000	11.1	1.00	93	2.1
BCX31B1	4.000	13.2	0.35	93	1.7
BCX31B2	4.000	-13.2	0.35	93	1.7
BCX31B3	4.000	-13.2	0.35	93	1.7
BCX31B4	4.000	13.2	0.35	93	1.7
BX31B	4.000	-18.6	2.66	93	4.2
BX32B	4.000	18.6	2.66	93	4.2
BCX32B1	4.000	13.2	0.35	93	1.7
BCX32B2	4.000	-13.2	0.35	93	1.7
BCX32B3	4.000	-13.2	0.35	93	1.7
BCX32B4	4.000	13.2	0.35	93	1.7
BY1B	4.000	-2.3	1.02	93	0.8
BY2B	4.000	-2.3	1.02	93	0.8