Parameter	Unit	Injection	Collision	
Net crossing angle IP1 & IP5	murad	0.00	0.00	
Crossing angle from spectrometer bump in IP2	murad	0.00	0.00	
Crossing angle from external bump in IP2	murad	0.00	0.00	
Net effective crossing angle IP2	murad	0.00	0.00	
Crossing angle from spectrometer bump in IP8	murad	0.00	0.00	
Crossing angle from external bump in IP8	murad	0.00	0.00	
Net effective crossing angle IP8	murad	0.00	0.00	
Separation IP1 & IP5	mm	5.00	0.00	
Transverse IP shift (crossing plane)	mm	0.00	0.00	
Separation IP2	mm	4.00	0.00	
Transverse IP shift (crossing plane)	mm	1.50	1.50	
Separation IP8	mm	4.00	0.00	
Transverse IP shift (crossing plane)	mm	2.00	2.00	
Beta * IP1 & IP5	m	11.00	11.00	
Beta * IP2	m	10.00	10.00	
Beta * IP8	m	10.00	10.00	
Crossing/Separation plane IP1		NA/H	NA/H	
Crossing/Separation plane IP2		NA/H	NA/H	
Crossing/Separation plane IP5		NA/V	NA/V	
Crossing/Separation plane IP8		NA/V	NA/V	
Energy	TeV	0.45	0.45	
Number of bunches		2	2	
Bunch intensity		1.00E+10	1.00E+10	
RF Voltage	MV	8/16	8	16
Longitudinal emittance	eV.s	0.50	0.50	
Normalised transverse emittance	mum.rad	3.50	3.50	
Derived parameters	Unit			
Protons per beam		2.00E+10	2.00E+10	
Current per beam	mA	0.04	0.04	
Stored energy per beam	MJ	0.001	0.001	
Relativistic Gamma		479.60	479.60	
RMS bunch length	cm	8.57/7.09	8.57	7.09
Beam size IP1 & IP5	mm	0.283	0.283	0.283
Beam size IP2	mm	0.270	0.270	0.270
Beam size IP8	mm	0.270	0.270	0.270
Geometric factor IP1 & IP5			1.000	1.000
Geometric factor IP2			1.000	1.000
Geometric factor IP8			1.000	1.000
Number of bunches crossing in IP1 & IP5			2	2
Number of bunches crossing in IP2			1	1
Number of bunches crossing in IP8			1	1
Luminosity in IP1 & IP5	cm-2 s-1		2.23E+26	2.23E+26
Luminosity in IP2	cm-2 s-1		1.23E+26	1.23E+26
Luminosity in IP8	cm-2 s-1		1.23E+26	1.23E+26
Events per crossing IP1 & IP5 (60 mbarn)			0.0006	0.0006
Events per crossing IP2 (60 mbarn)			0.0007	0.0007
Events per crossing IP8 (60 mbarn)			0.0007	0.0007

Compiled by M. Giovannozzi with input from W. Herr, J. Jowett, E. Métral, and E, Shaposhnikova

Parameter	Unit	Injection	Collision	
Net crossing angle IP1 & IP5	murad	0.00	0.00	
Crossing angle from spectrometer bump in IP2	murad	2177.78	196.00	
Crossing angle from external bump in IP2	murad	0.00	0.00	
Net effective crossing angle IP2	murad	2177.78	196.00	
Crossing angle from spectrometer bump in IP8	murad	4200.00	378.00	
Crossing angle from external bump in IP8	murad	0.00	0.00	
Net effective crossing angle IP8	murad	4200.00	378.00	
Separation IP1 & IP5	mm	5.00	0.00	
Transverse IP shift (crossing plane)	mm	0.00	0.50	
Separation IP2	mm	4.00	0.00	
Transverse IP shift (crossing plane)	mm	1.50	0.00	
Separation IP8	mm	4.00	0.00	
Transverse IP shift (crossing plane)	mm	2.00	0.00	
Beta * IP1 & IP5	m	11.00	3.00	
Beta * IP2	m	10.00	10.00	
Beta * IP8	m	10.00	6.00	
Crossing/Separation plane IP1		NA/H	NA/H	
Crossing/Separation plane IP2		V/H	V/H	
Crossing/Separation plane IP5		NA/V	NA/V	
Crossing/Separation plane IP8		H/V	H/V	
Energy	TeV	0.45	5.00	
Number of bunches		43	43	
Bunch intensity		4.00E+10	4.00E+10	
RF Voltage	MV	8/16	8	16
Longitudinal emittance	eV.s	1.00	1.00	
Normalised transverse emittance	mum.rad	3.50	3.75	
Derived parameters	Unit			
Protons per beam		1.72E+12	1.72E+12	
Current per beam	mA	3.09	3.09	
Stored energy per beam	MJ	0.12	1.38	
Relativistic Gamma		479.60	5328.90	
RMS bunch length	cm	13.19/10.51	6.49	5.41
Beam size IP1 & IP5	mm	0.283	0.046	0.046
Beam size IP2	mm	0.270	0.084	0.084
Beam size IP8	mm	0.270	0.065	0.065
Geometric factor IP1 & IP5			1.000	1.000
Geometric factor IP2			0.997	0.998
Geometric factor IP8			0.983	0.988
Number of bunches crossing in IP1 & IP5			43	43
Number of bunches crossing in IP2			4	4
Number of bunches crossing in IP8			19	19
Luminosity in IP1 & IP5	cm-2 s-1		2.92E+30	2.92E+30
Luminosity in IP2	cm-2 s-1		8.12E+28	8.12E+28
Luminosity in IP8	cm-2 s-1		6.33E+29	6.36E+29
Events per crossing IP1 & IP5 (60 mbarn)			0.36	0.36
Events per crossing IP2 (60 mbarn)			0.11	0.11
Events per crossing IP8 (60 mbarn)			0.18	0.18

Alternative collision schedules	A	B	C	D	E	
IP1	43	39	43	43		**43**
IP2	42	38	34	21		**4**
IP5	43	39	43	43		**43**
IP8	0	4	4	11		**19**

IBS		
Longitudinal emittance growth time	h	44
Transverse emittance growth time	h	158

Synchrotron radiation		
Power radiated per proton	W	4.80E-12
Power radiated/m in arc	W/m	3.09E-04
Power radiated per ring	W	5.41
Critical energy of photons	eV	16.09
Longitudinal emittance damping time	h	35.35
Transverse emittance damping time	h	70.70

Compiled by M. Giovannozzi with input from W. Herr, J. Jowett, E. Métral, and E, Shaposhnikova

Parameter	Unit	Injection	Collision	
Net crossing angle IP1 & IP5	murad	0.00	0.00	
Crossing angle from spectrometer bump in IP2	murad	2177.78	196.00	
Crossing angle from external bump in IP2	murad	0.00	0.00	
Net effective crossing angle IP2	murad	2177.78	196.00	
Crossing angle from spectrometer bump in IP8	murad	4200.00	378.00	
Crossing angle from external bump in IP8	murad	0.00	0.00	
Net effective crossing angle IP8	murad	4200.00	378.00	
Separation IP1 & IP5	mm	5.00	0.00	
Transverse IP shift (crossing plane)	mm	0.00	0.50	
Separation IP2	mm	4.00	0.00	
Transverse IP shift (crossing plane)	mm	1.50	0.00	
Separation IP8	mm	4.00	0.00	
Transverse IP shift (crossing plane)	mm	2.00	0.00	
Beta * IP1 & IP5	m	11.00	3.00	
Beta * IP2	m	10.00	10.00	
Beta * IP8	m	10.00	6.00	
Crossing/Separation plane IP1		NA/H	NA/H	
Crossing/Separation plane IP2		V/H	V/H	
Crossing/Separation plane IP5		NA/V	NA/V	
Crossing/Separation plane IP8		H/V	H/V	
Energy	TeV	0.45	5.00	
Number of bunches		156	156	
Bunch intensity		9.00E+10	9.00E+10	
RF Voltage	MV	8/16	8	16
Longitudinal emittance	eV.s	1.00	1.00	
Normalised transverse emittance	mum.rad	3.50	3.75	
Derived parameters	Unit			
Protons per beam		1.40E+13	1.40E+13	
Current per beam	mA	25.26	25.26	
Stored energy per beam	MJ	1.01	11.25	
Relativistic Gamma		479.60	5328.90	
RMS bunch length	cm	13.19/10.51	6.49	5.41
Beam size IP1 & IP5	mm	0.283	0.046	0.046
Beam size IP2	mm	0.270	0.084	0.084
Beam size IP8	mm	0.270	0.065	0.065
Geometric factor IP1 & IP5			1.000	1.000
Geometric factor IP2			0.997	0.998
Geometric factor IP8			0.983	0.988
Number of bunches crossing in IP1 & IP5			156	156
Number of bunches crossing in IP2			16	16
Number of bunches crossing in IP8			68	68
Luminosity in IP1 & IP5	cm-2 s-1		5.36E+31	5.36E+31
Luminosity in IP2	cm-2 s-1		1.64E+30	1.64E+30
Luminosity in IP8	cm-2 s-1		1.15E+31	1.15E+31
Events per crossing IP1 & IP5 (60 mbarn)			1.83	1.83
Events per crossing IP2 (60 mbarn)			0.55	0.55
Events per crossing IP8 (60 mbarn)			0.90	0.90

Alternative collision schedules	A	B	C
IP1	156	156	**156**
IP2	152	76	**16**
IP5	156	156	**156**
IP8	0	36	**68**

IBS		
Longitudinal emittance growth time	h	20
Transverse emittance growth time	h	70

Synchrotron radiation		
Power radiated per proton	W	4.80E-12
Power radiated/m in arc	W/m	6.96E-04
Power radiated per ring	W	12.18
Critical energy of photons	eV	16.09
Longitudinal emittance damping time	h	35.35
Transverse emittance damping time	h	70.70

Compiled by M. Giovannozzi with input from: W. Herr, J. Jowett, E. Métral, and E. Shaposhnikova

Parameter	Unit	Injection	Collision
Net crossing angle IP1 & IP5	murad	0.00	0.00
Crossing angle from spectrometer bump in IP2	murad	2177.78	140.00
Crossing angle from external bump in IP2	murad	0.00	0.00
Net effective crossing angle IP2	murad	2177.78	140.00
Crossing angle from spectrometer bump in IP8	murad	4200.00	270.00
Crossing angle from external bump in IP8	murad	0.00	0.00
Net effective crossing angle IP8	murad	4200.00	270.00
Separation IP1 & IP5	mm	5.00	5.00
Transverse IP shift (crossing plane)	mm	0.00	0.50
Separation IP2	mm	4.00	4.00
Transverse IP shift (crossing plane)	mm	1.50	0.00
Separation IP8	mm	4.00	4.00
Transverse IP shift (crossing plane)	mm	2.00	0.00
Beta * IP1 & IP5	m	11.00	2.00
Beta * IP2	m	10.00	10.00
Beta * IP8	m	10.00	2.00
Crossing/Separation plane IP1		NA/H	NA/H
Crossing/Separation plane IP2		V/H	V/H
Crossing/Separation plane IP5		NA/V	NA/V
Crossing/Separation plane IP8		H/V	H/V
Energy	TeV	0.45	7.00
Number of bunches		43	43
Bunch intensity		4.00E+10	4.00E+10
RF Voltage	MV	8	16
Longitudinal emittance	eV.s	1.00	2.50
Normalised transverse emittance	mum.rad	3.50	3.75
Derived parameters	Unit		
Protons per beam		1.72E+12	1.72E+12
Current per beam	mA	3.09	3.09
Stored energy per beam	MJ	0.12	1.93
Relativistic Gamma		479.60	7460.46
RMS bunch length	cm	11.24	7.55
Beam size IP1 & IP5	mm	0.283	0.032
Beam size IP2	mm	0.270	0.071
Beam size IP8	mm	0.270	0.032
Geometric factor IP1 & IP5			1.000
Geometric factor IP2			0.997
Geometric factor IP8			0.952
Number of bunches crossing in IP1 & IP5			43
Number of bunches crossing in IP2			4
Number of bunches crossing in IP8			19
Luminosity in IP1 & IP5	cm-2 s-1		6.12E+30
Luminosity in IP2	cm-2 s-1		1.14E+29
Luminosity in IP8	cm-2 s-1		2.58E+30
Events per crossing IP1 & IP5 (60 mbarn)			0.76
Events per crossing IP2 (60 mbarn)			0.15
Events per crossing IP8 (60 mbarn)			0.72

Alternative collision schedules	A	B	C	D	E	
IP1	43	39	43	43	**43**	
IP2	42	38	34	21	**4**	
IP5	43	39	43	43	**43**	
IP8	0	4	4	11	**19**	

IBS		
Longitudinal emittance growth time	h	40
Transverse emittance growth time	h	167
Synchrotron radiation		
Power radiated per proton	W	1.84E-11
Power radiated/m in arc	W/m	1.19E-03
Power radiated per ring	W	20.80
Critical energy of photons	eV	44.14
Longitudinal emittance damping time	h	12.88
Transverse emittance damping time	h	25.76

Compiled by M. Giovannozzi with input from: W. Herr, J. Jowett, E. Métral, and E. Shaposhnikova

Parameter	Unit	Injection	Collision
Net crossing angle IP1 & IP5	murad	0.00	0.00
Crossing angle from spectrometer bump in IP2	murad	2177.78	140.00
Crossing angle from external bump in IP2	murad	0.00	0.00
Net effective crossing angle IP2	murad	2177.78	140.00
Crossing angle from spectrometer bump in IP8	murad	4200.00	270.00
Crossing angle from external bump in IP8	murad	0.00	0.00
Net effective crossing angle IP8	murad	4200.00	270.00
Separation IP1 & IP5	mm	5.00	5.00
Transverse IP shift (crossing plane)	mm	0.00	0.50
Separation IP2	mm	4.00	4.00
Transverse IP shift (crossing plane)	mm	1.50	0.00
Separation IP8	mm	4.00	4.00
Transverse IP shift (crossing plane)	mm	2.00	0.00
Beta * IP1 & IP5	m	11.00	2.00
Beta * IP2	m	10.00	10.00
Beta * IP8	m	10.00	2.00
Crossing/Separation plane IP1		NA/H	NA/H
Crossing/Separation plane IP2		V/H	V/H
Crossing/Separation plane IP5		NA/V	NA/V
Crossing/Separation plane IP8		H/V	H/V
Energy	TeV	0.45	7.00
Number of bunches		156	156
Bunch intensity		9.00E+10	9.00E+10
RF Voltage	MV	8	16
Longitudinal emittance	eV.s	1.00	2.50
Normalised transverse emittance	mum.rad	3.50	3.75
Derived parameters	Unit		
Protons per beam		1.40E+13	1.40E+13
Current per beam	mA	25.26	25.26
Stored energy per beam	MJ	1.01	15.75
Relativistic Gamma		479.60	7460.46
RMS bunch length	cm	11.24	7.55
Beam size IP1 & IP5	mm	0.283	0.032
Beam size IP2	mm	0.270	0.071
Beam size IP8	mm	0.270	0.032
Geometric factor IP1 & IP5			1.000
Geometric factor IP2			0.997
Geometric factor IP8			0.952
Number of bunches crossing in IP1 & IP5			156
Number of bunches crossing in IP2			16
Number of bunches crossing in IP8			68
Luminosity in IP1 & IP5	cm-2 s-1		1.12E+32
Luminosity in IP2	cm-2 s-1		2.30E+30
Luminosity in IP8	cm-2 s-1		4.67E+31
Events per crossing IP1 & IP5 (60 mbarn)			3.85
Events per crossing IP2 (60 mbarn)			0.77
Events per crossing IP8 (60 mbarn)			3.66
Alternative collision schedules	A	B	C
IP1	156	156	**156**
IP2	152	76	**16**
IP5	156	156	**156**
IP8	0	36	**68**
IBS			
Longitudinal emittance growth time	h		18
Transverse emittance growth time	h		74
Synchrotron radiation			
Power radiated per proton	W		1.84E-11
Power radiated/m in arc	W/m		2.67E-03
Power radiated per ring	W		46.80
Critical energy of photons	eV		44.14
Longitudinal emittance damping time	h		12.88
Transverse emittance damping time	h		25.76

Compiled by M. Giovannozzi with input from: W. Herr, J. Jowett, E. Métral, and E. Shaposhnikova

Parameter	Unit	Injection	Collision	Injection	Collision
Net crossing angle IP1 & IP5	murad	400.00	250.00		
Crossing angle from spectrometer bump in IP2	murad	140.00	140.00	-140.00	-140.00
Crossing angle from external bump in IP2	murad	340.00	160.00	-340.00	-160.00
Net effective crossing angle IP2	murad	480.00	300.00	-480.00	-300.00
Crossing angle from spectrometer bump in IP8	murad	-270.00	-270.00	270.00	270.00
Crossing angle from external bump in IP8	murad	-330.00	-130.00	-340.00	-420.00
Net effective crossing angle IP8	murad	-600.00	-400.00	-70.00	-150.00
Separation IP1 & IP5	mm	5.00	5.00		
Transverse IP shift (crossing plane)	mm	0.00	0.50		
Separation IP2	mm	4.00	4.00		
Transverse IP shift (crossing plane)	mm	1.50	0.00		
Separation IP8	mm	4.00	4.00		
Transverse IP shift (crossing plane)	mm	2.00	0.00		
Beta * IP1 & IP5	m	11.00	2.00		
Beta * IP2	m	10.00	10.00		
Beta * IP8	m	10.00	2.00		
Crossing/Separation plane IP1		V/H	V/H		
Crossing/Separation plane IP2		V/H	V/H		
Crossing/Separation plane IP5		H/V	H/V		
Crossing/Separation plane IP8		H/V	H/V		
Energy	TeV	0.45	7.00		
Number of bunches		936	936		
Bunch intensity		4.00E+10	4.00E+10		
RF Voltage	MV	8	16		
Longitudinal emittance	eV.s	1.00	2.50		
Normalised transverse emittance	mum.rad	3.50	3.75		
Derived parameters	Unit				
Protons per beam		3.74E+13	3.74E+13		
Current per beam	mA	67.36	67.36		
Stored energy per beam	MJ	2.70	42.00		
Relativistic Gamma		479.60	7460.46		
RMS bunch length	cm	11.24	7.55		
Beam size IP1 & IP5	mm	0.283	0.032		
Beam size IP2	mm	0.270	0.071		
Beam size IP8	mm	0.270	0.032		
Geometric factor IP1 & IP5			0.958		
Geometric factor IP2			0.987		
Geometric factor IP8			0.903		
Number of bunches crossing in IP1 & IP5			936		
Number of bunches crossing in IP2			912		
Number of bunches crossing in IP8			874		
Luminosity in IP1 & IP5	cm-2 s-1		1.28E+32		
Luminosity in IP2	cm-2 s-1		2.57E+31		
Luminosity in IP8	cm-2 s-1		1.12E+32		
Events per crossing IP1 & IP5 (60 mbarn)			0.73		
Events per crossing IP2 (60 mbarn)			0.15		
Events per crossing IP8 (60 mbarn)			0.69		

Compiled by M. Giovannozzi with input from: W. Herr, J. Jowett, E. Métral, and E. Shaposhnikova

Parameter	Unit	Injection	Collision	Injection	Collision
Net crossing angle IP1 & IP5	murad	400.00	250.00		
Crossing angle from spectrometer bump in IP2	murad	140.00	140.00	-140.00	-140.00
Crossing angle from external bump in IP2	murad	340.00	160.00	-340.00	-160.00
Net effective crossing angle IP2	murad	480.00	300.00	-480.00	-300.00
Crossing angle from spectrometer bump in IP8	murad	-270.00	-270.00	270.00	270.00
Crossing angle from external bump in IP8	murad	-330.00	-130.00	-340.00	-420.00
Net effective crossing angle IP8	murad	-600.00	-400.00	-70.00	-150.00
Separation IP1 & IP5	mm	5.00	5.00		
Transverse IP shift (crossing plane)	mm	0.00	0.50		
Separation IP2	mm	4.00	4.00		
Transverse IP shift (crossing plane)	mm	1.50	0.00		
Separation IP8	mm	4.00	4.00		
Transverse IP shift (crossing plane)	mm	2.00	0.00		
Beta * IP1 & IP5	m	11.00	1.00		
Beta * IP2	m	10.00	10.00		
Beta * IP8	m	10.00	10.00		
Crossing/Separation plane IP1		V/H	V/H		
Crossing/Separation plane IP2		V/H	V/H		
Crossing/Separation plane IP5		H/V	H/V		
Crossing/Separation plane IP8		H/V	H/V		
Energy	TeV	0.45	7.00		
Number of bunches		936	936		
Bunch intensity		9.00E+10	9.00E+10		
RF Voltage	MV	8	16		
Longitudinal emittance	eV.s	1.00	2.50		
Normalised transverse emittance	mum.rad	3.50	3.75		
Derived parameters	Unit				
Protons per beam		8.42E+13	8.42E+13		
Current per beam	mA	151.56	151.56		
Stored energy per beam	MJ	6.08	94.50		
Relativistic Gamma		479.60	7460.46		
RMS bunch length	cm	11.24	7.55		
Beam size IP1 & IP5	mm	0.283	0.022		
Beam size IP2	mm	0.270	0.071		
Beam size IP8	mm	0.270	0.071		
Geometric factor IP1 & IP5			0.922		
Geometric factor IP2			0.987		
Geometric factor IP8			0.978		
Number of bunches crossing in IP1 & IP5			936		
Number of bunches crossing in IP2			912		
Number of bunches crossing in IP8			874		
Luminosity in IP1 & IP5	cm-2 s-1		1.24E+33		
Luminosity in IP2	cm-2 s-1		1.30E+32		
Luminosity in IP8	cm-2 s-1		1.23E+32		
Events per crossing IP1 & IP5 (60 mbarn)			7.09		
Events per crossing IP2 (60 mbarn)			0.76		
Events per crossing IP8 (60 mbarn)			0.75		

Compiled by M. Giovannozzi with input from: W. Herr, J. Jowett, E. Métral, and E. Shaposhnikova

Parameter	Unit	Injection	Collision	Injection	Collision
Net crossing angle IP1 & IP5	murad	400.00	250.00		
Crossing angle from spectrometer bump in IP2	murad	140.00	140.00	-140.00	-140.00
Crossing angle from external bump in IP2	murad	340.00	160.00	-340.00	-160.00
Net effective crossing angle IP2	murad	480.00	300.00	-480.00	-300.00
Crossing angle from spectrometer bump in IP8	murad	-270.00	-270.00	270.00	270.00
Crossing angle from external bump in IP8	murad	-330.00	-130.00	-340.00	-420.00
Net effective crossing angle IP8	murad	-600.00	-400.00	-70.00	-150.00
Separation IP1 & IP5	mm	5.00	5.00		
Transverse IP shift (crossing plane)	mm	0.00	0.50		
Separation IP2	mm	4.00	4.00		
Transverse IP shift (crossing plane)	mm	1.50	0.00		
Separation IP8	mm	4.00	4.00		
Transverse IP shift (crossing plane)	mm	2.00	0.00		
Beta * IP1 & IP5	m	11.00	2.00		
Beta * IP2	m	10.00	10.00		
Beta * IP8	m	10.00	2.00		
Crossing/Separation plane IP1		V/H	V/H		
Crossing/Separation plane IP2		V/H	V/H		
Crossing/Separation plane IP5		H/V	H/V		
Crossing/Separation plane IP8		H/V	H/V		
Energy	TeV	0.45	7.00		
Number of bunches		1333	1333		
Bunch intensity		4.00E+10	4.00E+10		
RF Voltage	MV	8	16		
Longitudinal emittance	eV.s	1.00	2.50		
Normalised transverse emittance	mum.rad	3.50	3.75		
Derived parameters	Unit				
Protons per beam		5.33E+13	5.33E+13		
Current per beam	mA	95.93	95.93		
Stored energy per beam	MJ	3.85	59.81		
Relativistic Gamma		479.60	7460.46		
RMS bunch length	cm	11.24	7.55		
Beam size IP1 & IP5	mm	0.283	0.032		
Beam size IP2	mm	0.270	0.071		
Beam size IP8	mm	0.270	0.032		
Geometric factor IP1 & IP5			0.958		
Geometric factor IP2			0.987		
Geometric factor IP8			0.903		
Number of bunches crossing in IP1 & IP5			1333		
Number of bunches crossing in IP2			2		
Number of bunches crossing in IP8			1173		
Luminosity in IP1 & IP5	cm-2 s-1		1.82E+32		
Luminosity in IP2	cm-2 s-1		5.63E+28		
Luminosity in IP8	cm-2 s-1		1.51E+32		
Events per crossing IP1 & IP5 (60 mbarn)			0.73		
Events per crossing IP2 (60 mbarn)			0.15		
Events per crossing IP8 (60 mbarn)			0.69		

Alternative collision schedules	A	B	C	D	E
IP1	1404	1404	1404	1404	**1333**
IP2	1368	684	0	72	**2**
IP5	1404	1404	1404	1404	**1333**
IP8	0	655	1311	1242	**1173**

Compiled by M. Giovannozzi with input from: W. Herr, J. Jowett, E. Métral, and E. Shaposhnikova

Parameter	Unit	Injection	Collision	Injection	Collision
Net crossing angle IP1 & IP5	murad	400.00	250.00		
Crossing angle from spectrometer bump in IP2	murad	140.00	140.00	-140.00	-140.00
Crossing angle from external bump in IP2	murad	340.00	160.00	-340.00	-160.00
Net effective crossing angle IP2	murad	480.00	300.00	-480.00	-300.00
Crossing angle from spectrometer bump in IP8	murad	-270.00	-270.00	270.00	270.00
Crossing angle from external bump in IP8	murad	-330.00	-130.00	-340.00	-420.00
Net effective crossing angle IP8	murad	-600.00	-400.00	-70.00	-150.00
Separation IP1 & IP5	mm	5.00	5.00		
Transverse IP shift (crossing plane)	mm	0.00	0.50		
Separation IP2	mm	4.00	4.00		
Transverse IP shift (crossing plane)	mm	1.50	0.00		
Separation IP8	mm	4.00	4.00		
Transverse IP shift (crossing plane)	mm	2.00	0.00		
Beta * IP1 & IP5	m	11.00	1.00		
Beta * IP2	m	10.00	10.00		
Beta * IP8	m	10.00	10.00		
Crossing/Separation plane IP1		V/H	V/H		
Crossing/Separation plane IP2		V/H	V/H		
Crossing/Separation plane IP5		H/V	H/V		
Crossing/Separation plane IP8		H/V	H/V		
Energy	TeV	0.45	7.00		
Number of bunches		2808	2808		
Bunch intensity		5.00E+10	5.00E+10		
RF Voltage	MV	8	16		
Longitudinal emittance	eV.s	1.00	2.50		
Normalised transverse emittance	mum.rad	3.50	3.75		
Derived parameters	Unit				
Protons per beam		1.40E+14	1.40E+14		
Current per beam	mA	252.61	252.61		
Stored energy per beam	MJ	10.13	157.50		
Relativistic Gamma		479.60	7460.46		
RMS bunch length	cm	11.24	7.55		
Beam size IP1 & IP5	mm	0.283	0.022		
Beam size IP2	mm	0.270	0.071		
Beam size IP8	mm	0.270	0.071		
Geometric factor IP1 & IP5			0.922		
Geometric factor IP2			0.987		
Geometric factor IP8			0.978		
Number of bunches crossing in IP1 & IP5			2808		
Number of bunches crossing in IP2			2736		
Number of bunches crossing in IP8			2622		
Luminosity in IP1 & IP5	cm-2 s-1		1.15E+33		
Luminosity in IP2	cm-2 s-1		1.20E+32		
Luminosity in IP8	cm-2 s-1		1.14E+32		
Events per crossing IP1 & IP5 (60 mbarn)			2.19		
Events per crossing IP2 (60 mbarn)			0.23		
Events per crossing IP8 (60 mbarn)			0.23		

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Parameter	Unit	Injection	Collision	Injection	Collision
Net crossing angle IP1 & IP5	murad	400.00	250.00		
Crossing angle from spectrometer bump in IP2	murad	140.00	140.00	-140.00	-140.00
Crossing angle from external bump in IP2	murad	340.00	160.00	-340.00	-160.00
Net effective crossing angle IP2	murad	480.00	300.00	-480.00	-300.00
Crossing angle from spectrometer bump in IP8	murad	-270.00	-270.00	270.00	270.00
Crossing angle from external bump in IP8	murad	-330.00	-130.00	-340.00	-420.00
Net effective crossing angle IP8	murad	-600.00	-400.00	-70.00	-150.00
Separation IP1 & IP5	mm	5.00	5.00		
Transverse IP shift (crossing plane)	mm	0.00	0.50		
Separation IP2	mm	4.00	4.00		
Transverse IP shift (crossing plane)	mm	1.50	0.00		
Separation IP8	mm	4.00	4.00		
Transverse IP shift (crossing plane)	mm	2.00	0.00		
Beta * IP1 & IP5	m	11.00	0.55		
Beta * IP2	m	10.00	10.00		
Beta * IP8	m	10.00	10.00		
Crossing/Separation plane IP1		V/H	V/H		
Crossing/Separation plane IP2		V/H	V/H		
Crossing/Separation plane IP5		H/V	H/V		
Crossing/Separation plane IP8		H/V	H/V		
Energy	TeV	0.45	7.00		
Number of bunches		2808	2808		
Bunch intensity		5.00E+10	5.00E+10		
RF Voltage	MV	8	16		
Longitudinal emittance	eV.s	1.00	2.50		
Normalised transverse emittance	mum.rad	3.50	3.75		
Derived parameters	Unit				
Protons per beam		1.40E+14	1.40E+14		
Current per beam	mA	252.61	252.61		
Stored energy per beam	MJ	10.13	157.50		
Relativistic Gamma		479.60	7460.46		
RMS bunch length	cm	11.24	7.55		
Beam size IP1 & IP5	mm	0.283	0.017		
Beam size IP2	mm	0.270	0.071		
Beam size IP8	mm	0.270	0.071		
Geometric factor IP1 & IP5			0.870		
Geometric factor IP2			0.987		
Geometric factor IP8			0.978		
Number of bunches crossing in IP1 & IP5			2808		
Number of bunches crossing in IP2			2736		
Number of bunches crossing in IP8			2622		
Luminosity in IP1 & IP5	cm-2 s-1		1.98E+33		
Luminosity in IP2	cm-2 s-1		1.20E+32		
Luminosity in IP8	cm-2 s-1		1.14E+32		
Events per crossing IP1 & IP5 (60 mbarn)			3.75		
Events per crossing IP2 (60 mbarn)			0.23		
Events per crossing IP8 (60 mbarn)			0.23		

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Parameter	Unit	Injection	Collision	Injection	Collision
Net crossing angle IP1 & IP5	murad	400.00	285.00		
Crossing angle from spectrometer bump in IP2	murad	140.00	140.00	-140.00	-140.00
Crossing angle from external bump in IP2	murad	340.00	160.00	-340.00	-160.00
Net effective crossing angle IP2	murad	480.00	300.00	-480.00	-300.00
Crossing angle from spectrometer bump in IP8	murad	-270.00	-270.00	270.00	270.00
Crossing angle from external bump in IP8	murad	-330.00	-130.00	-340.00	-420.00
Net effective crossing angle IP8	murad	-600.00	-400.00	-70.00	-150.00
Separation IP1 & IP5	mm	5.00	5.00		
Transverse IP shift (crossing plane)	mm	0.00	0.50		
Separation IP2	mm	4.00	4.00		
Transverse IP shift (crossing plane)	mm	1.50	0.00		
Separation IP8	mm	4.00	4.00		
Transverse IP shift (crossing plane)	mm	2.00	0.00		
Beta * IP1 & IP5	m	11.00	1.00		
Beta * IP2	m	10.00	10.00		
Beta * IP8	m	10.00	10.00		
Crossing/Separation plane IP1		V/H	V/H		
Crossing/Separation plane IP2		V/H	V/H		
Crossing/Separation plane IP5		H/V	H/V		
Crossing/Separation plane IP8		H/V	H/V		
Energy	TeV	0.45	7.00		
Number of bunches		2808	2808		
Bunch intensity		9.00E+10	9.00E+10		
RF Voltage	MV	8	16		
Longitudinal emittance	eV.s	1.00	2.50		
Normalised transverse emittance	mum.rad	3.50	3.75		
Derived parameters	Unit				
Protons per beam		2.53E+14	2.53E+14		
Current per beam	mA	454.69	454.69		
Stored energy per beam	MJ	18.23	283.50		
Relativistic Gamma		479.60	7460.46		
RMS bunch length	cm	11.24	7.55		
Beam size IP1 & IP5	mm	0.283	0.022		
Beam size IP2	mm	0.270	0.071		
Beam size IP8	mm	0.270	0.071		
Geometric factor IP1 & IP5			0.902		
Geometric factor IP2			0.987		
Geometric factor IP8			0.978		
Number of bunches crossing in IP1 & IP5			2808		
Number of bunches crossing in IP2			2736		
Number of bunches crossing in IP8			2622		
Luminosity in IP1 & IP5	cm-2 s-1		3.65E+33		
Luminosity in IP2	cm-2 s-1		3.90E+32		
Luminosity in IP8	cm-2 s-1		3.70E+32		
Events per crossing IP1 & IP5 (60 mbarn)			6.94		
Events per crossing IP2 (60 mbarn)			0.76		
Events per crossing IP8 (60 mbarn)			0.75		

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Parameter	Unit	Injection	Collision	Injection	Collision
Net crossing angle IP1 & IP5	murad	400.00	285.00		
Crossing angle from spectrometer bump in IP2	murad	140.00	140.00	-140.00	-140.00
Crossing angle from external bump in IP2	murad	340.00	160.00	-340.00	-160.00
Net effective crossing angle IP2	murad	480.00	300.00	-480.00	-300.00
Crossing angle from spectrometer bump in IP8	murad	-270.00	-270.00	270.00	270.00
Crossing angle from external bump in IP8	murad	-330.00	-130.00	-340.00	-420.00
Net effective crossing angle IP8	murad	-600.00	-400.00	-70.00	-150.00
Separation IP1 & IP5	mm	5.00	5.00		
Transverse IP shift (crossing plane)	mm	0.00	0.50		
Separation IP2	mm	4.00	4.00		
Transverse IP shift (crossing plane)	mm	1.50	0.00		
Separation IP8	mm	4.00	4.00		
Transverse IP shift (crossing plane)	mm	2.00	0.00		
Beta * IP1 & IP5	m	11.00	0.55		
Beta * IP2	m	10.00	10.00		
Beta * IP8	m	10.00	10.00		
Crossing/Separation plane IP1		V/H	V/H		
Crossing/Separation plane IP2		V/H	V/H		
Crossing/Separation plane IP5		H/V	H/V		
Crossing/Separation plane IP8		H/V	H/V		
Energy	TeV	0.45	7.00		
Number of bunches		2808	2808		
Bunch intensity		1.15E+11	1.15E+11		
RF Voltage	MV	8	16		
Longitudinal emittance	eV.s	1.00	2.50		
Normalised transverse emittance	mum.rad	3.50	3.75		
Derived parameters	Unit				
Protons per beam		3.23E+14	3.23E+14		
Current per beam	mA	581.00	581.00		
Stored energy per beam	MJ	23.29	362.25		
Relativistic Gamma		479.60	7460.46		
RMS bunch length	cm	11.24	7.55		
Beam size IP1 & IP5	mm	0.283	0.017		
Beam size IP2	mm	0.270	0.071		
Beam size IP8	mm	0.270	0.071		
Geometric factor IP1 & IP5			0.840		
Geometric factor IP2			0.987		
Geometric factor IP8			0.978		
Number of bunches crossing in IP1 & IP5			2808		
Number of bunches crossing in IP2			2736		
Number of bunches crossing in IP8			2622		
Luminosity in IP1 & IP5	cm-2 s-1		1.01E+34		
Luminosity in IP2	cm-2 s-1		6.36E+32		
Luminosity in IP8	cm-2 s-1		6.04E+32		
Events per crossing IP1 & IP5 (60 mbarn)			19.18		
Events per crossing IP2 (60 mbarn)			1.24		
Events per crossing IP8 (60 mbarn)			1.23		

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