

LHC Optics Web for V6.500

■ New easy-to-remember shortcut:

- <http://cern.ch/lhcoptics>
- Or via LHC home page ("Lattice and Optics" link):

/plsq/navigation.tree?top=CERN-0000008144&open=CERN-0000008144&expand_open=Y

LHC Optics Web

Contents

[About these pages](#)

V6.5, (V6.500 in construction), Older Versions of the LHC Optics

[Ways of Viewing the LHC Optics](#)

[About the MAD input files \("sample jobs"\)](#)

[About the data formats for LHC Optics tables](#)

[Hints on using the Structured Spreadsheets](#)

[Comparisons between different versions of the LHC Optics](#)

[The Beam Aperture \(new in September 2003\)](#)

[MAD input files for past and present versions of LHC Optics](#)

About these pages

These LHC Optics Web pages are normally accessed via the [LHC Project Pages](#) (click on the link for "Lattice and Optics" under the heading "Beam Parameters").

- V6.500 in construction
- "Collision" case prototype

Changes in process – not yet visible on Web

■ New version of main page

- Shorter, with links to new documentation pages
- Clearer explanation of hierarchy
- Clarifications of table formats

■ New configuration pages

- Includes “early”, “ions”, ...
- More example MAD files (“sample jobs”)

■ New table content (requested by experiments)

- HKICK and VKICK values
- DPY values
- Aperture at ends of elements
- Spreadsheet version have more information and functionality than the original TFS files from MAD

New explanation of hierarchy

Organizational Hierarchy

The data is organized in a hierarchy as follows:

Optics Version

The version of the LHC optics (e.g., V6.5) corresponding to a defined layout of the machine components.

Configuration

For each Optics Version there are several states of the LHC for which an optics exists (e.g. Injection). This is defined not only by the power supply settings but also by the nominal parameters of the two beams (energy, emittance, etc.). From these follow the calculated values of the orbit and optical functions (so-called "Twiss functions").

Selection

Most often, this is a part of the machine (known as a **Lattice Module**) for which the optical information is presented (e.g., a long straight section like IR2, or a generic ArcCell). In such cases values are given at the exits of all the machine elements (dipole magnets, quadrupoles, BPMs, drift spaces,). However, in some cases (e.g., the Interaction Points module) only a selection of elements is used.

Sequence

This is either "Beam 1" or "Beam 2" (the MAD sequences for the two rings are called LHCB1 and LHCB2), usually presented side-by-side on a Web page. Although one often speaks loosely of Ring 1 or Ring 2, Beam 1 or Beam 2, etc., it should be remembered that both the beam and the hardware are ingredients

Spreadsheet changes

LHCB2IR5.xls

	A	B	C	D	E	F
1	MADMACS processed file at:				18-05-06	10:51:57
2	Right-Click/HyperLink/Open in New Window for help with this file					
3	ALFA	0.000321				
4	BCURRENT	0.000198				
5	BETXMAX	4401.745				
6	BETYMAX	4401.744				
7	Brho	23349.5				
8	CHARGE	1				
9	DATE	17/05/06				
10	DELTAP	0				
11	DQ1	42.01571				
12	DQ2	42.73459				
13	DXMAX	3.218298				
14	DXRMS	1.417443				
15	DYMAX	1.385028				
16	DYRMS	0.195723				
17	ENERGY	7000				
18	ET	1				
19	EX	5.03E-10				
20	EY	5.03E-10				
21	GAMMA	7460.523				
22	GAMMATR	55.81727				
23	KBUNCH	1				
24	LENGTH	26658.88				
25	MASS	0.938272				
26	NPART	1.10E+11				
27	OpticsSource	lafs.cern.ch/eng/lhc/optics/V6.500/				
28	ORBITS	0				
29	ORIGIN	MAD-X 3.03.02 Linux				

DXMAX	0.000110					
DXRMS	0.000484					
KEYWORD	NAME	PAREN	L	HKICK	VKICK	K
JCKER	MCBH.13L	MCBH		0.647	0	0
JCKER	MCBV.12L	MCBV		0.647	0	0
JCKER	MCBH.11L	MCBH		0.647	0	0
JCKER	MCBCV.10L	MCBCV		0.9	0	0
JCKER	MCBCH.9L	MCBCH		0.9	0	0
JCKER	MCBCV.8L	MCBCV		0.9	0	0
JCKER	MCBCH.7L	MCBCH		0.9	0	0
JCKER	MCBCV.6L	MCBCV		0.9	0	-3.66E-06
JCKER	MSIB.C6L	MSIB		4	0	0
JCKER	MSIB.B6L	MSIB		4	0	0
JCKER	MSIB.A6L	MSIB		4	0	0
JCKER	MSIA.B6L	MSIA		4	0	0
JCKER	MSIA.A6L	MSIA		4	0	0

	DPY	APERT	APER	APER	APER	APER
!404	0.004052	RECTELLI	0.024	0.023999	0.024	0.024
!404	0.004052	NONE	0	0	0	0
!404	0.004052	RECTELLI	0.024	0.024	0.024	0.024
!404	0.004052	NONE	0	0	0	0
!765	0.004106	RECTELLI	0.022	0.01715	0.022	0.022
!765	0.004106	NONE	0	0	0	0
!838	0.001877	RECTELLI	0.022	0.01715	0.022	0.022

Further planned improvements

■ SURVEY information

- Cleaner implementation with less duplication
- Downloadable geometric transformations for each insertion, etc.

■ Aperture

- Downloadable functions
- Included in all MAD samples
- Added to 3D beam envelopes
- New 2D plots

