

# SETTING UP YOUR BEAM IN THE EAST AREA

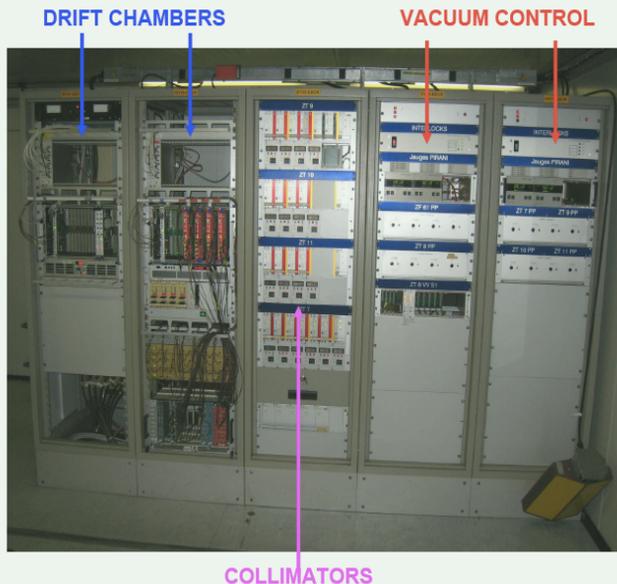
## Generalities on beam control For experts:

The secondary beam lines are controlled partly by local electronics in the EBCR control room, partly from two Linux computers in that same room or from the beam terminal in your control room.

On the computers in the EBCR, please make sure you are using the correct workspace (tab).

Further help can be obtained 24 hours per day from the CCC:  
**Call 76677**

For users:



## Booting the computer

The computers auto-boot: **please do not type a user name or password**, but wait 30 seconds for the computer to start up

## The Cesar control system

Cesar can be started by right-clicking on the desktop. Task icons allow to perform specific tasks. The menu bar and 'physicst tree' are more for experts.

A screenshot of the Cesar GUI interface. The window title is 'CESAR GUI 0.25.1 CPS.USER.EAST1'. The menu bar includes 'Stat', 'File', 'Tools', 'Detectors', 'EA', 'View', and 'Window'. The toolbar contains icons for 'tree', 'Magnet status', 'Rectifier status', 'XDWC status', 'XDWC profiles', 'Beam file browser', and 'Workspace tabs'. The workspace tabs are labeled 'ZT10', 'ZT11', 'ZT8', and 'ZT9'. Below the workspace tabs, there are labels for 'Beam stopper status', 'EXPT status', 'Scans', and 'Scintillator status'. Arrows point from these labels to the corresponding icons or tabs in the interface.

## In case of Cesar problems

In case Cesar blocks or does not behave correctly, you may stop it by closing the Cesar window. It can be restarted by a right-click in the desktop and selecting CESAR.

In the EBCR, please click in the tab of the work space for your beam line!

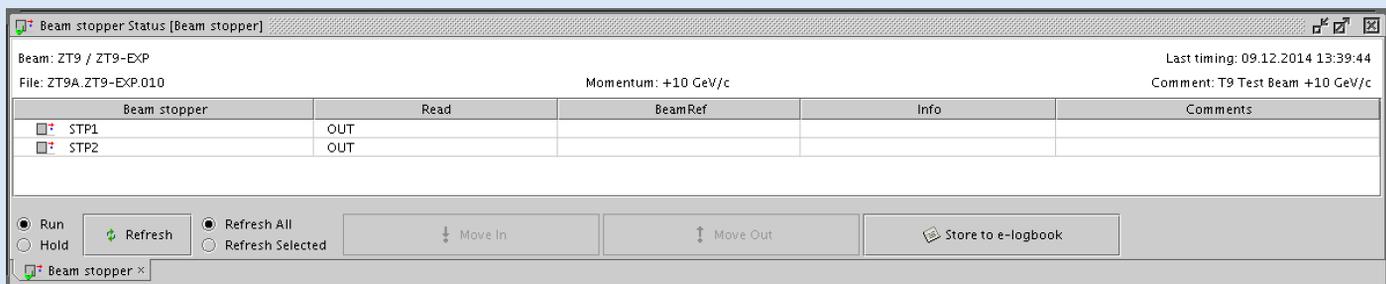
In case you do not manage to solve the problem, please call the CCC (76677).

## Switching off and on the beam

Access to the beam zone is only possible when the beam is safely stopped.

The beam is stopped by one (T10, T11) or two (T9) beam stoppers.

The Beam Stopper Status allows to put them IN (beam stopped) or OUT.



Select the beam stopper(s) and click Move in or Move out.

Only when the beam stopper(s) is (are) IN the beam, you may control the state of the access door via the touchscreen next to the door.

The only state of the door allowing beam is CLOSED.

The LOCKED state does not allow beam.

In KEY ACCESS, **every** person entering the zone must take a key.

When all keys are back, anyone can close the zone again.

FREE ACCESS allows to enter the zone without a key. However, going back to CLOSED requires a full search (patrol) by a trained and authorised person from your team!

Finally, only use the Emergency Passage button in the door for real emergencies!

The beam stoppers will only move out when the zone is CLOSED !

# Magnet Control

Click on the Magnet status icon

Magnet Status [Magnets]

Beam: ZT9 / ZT9-EXP  
File: ZT9A.ZT9-EXP.010  
Momentum: +10 GeV/c  
Last timing: 09.12.2014 13:37:49  
Comment: T9 Test Beam +10 GeV/c

Magnets	Read	BeamRef	Max	Polarity	Info	F	Comments
QDE1	406.3	406.3	850	N	Def_Quad		
QFO2	353.3	353.3	900	N	Foc_Quad		
BHZ1	893.1	893.3	1400	N	Hor.Bend		
QFO3	290.2	290.1	850	N	Foc_Quad		
BHZ2	245.4	245.4	450	N	Hor.Bend		
QFO4	153.4	153.6	500	N	Foc_Quad		
BHZ3	238.6	239.0	450	N	Hor.Bend	F	<>BeamRef
QDE5	264.1	264.2	500	N	Def_Quad	F	
BVT1	367.8	367.7	675	N	Vert.Bend	F	
QDE6	448.9	449.0	675	N	Def_Quad	F	
QFO7	463.9	464.0	675	N	Foc_Quad	F	

Run Hold Refresh Refresh All Refresh Selected Set Current SET TO BEAM REF Display Faults Rectifier Status Store to e-logbo...

The **Read** column shows the actual value, the **BeamRef** the last requested value. You may change the value by selecting a magnet and clicking on Set. BeamRef and setting can also be modified by loading a beam file. A 'F' in the 7<sup>th</sup> column indicates that the BeamRef is different from the current in the active beam file (e.g. by tuning its value).

You may also select settings according to the reference (plastified) sheets in the control rooms, also available on the East Area web page.

**However, all horizontal bends except the last must always be on nominal!**

Positive currents for positive beams, negative currents for negative beams (except for the CLOUD big beam).

**BHZ** and **BVT** stand for **Bend Horiz**ONtal and **Bend Ver**Tical , respectively.

**QDE** and **QFO** for **Quad DE**focusing or **Quad FO**ocusing (in the horizontal plane)

In case there is a problem (shown in red), i.e. Read and BeamRef stay different, you may use the Rectifier status to cure it:

Rectifier Status [Rectifiers]

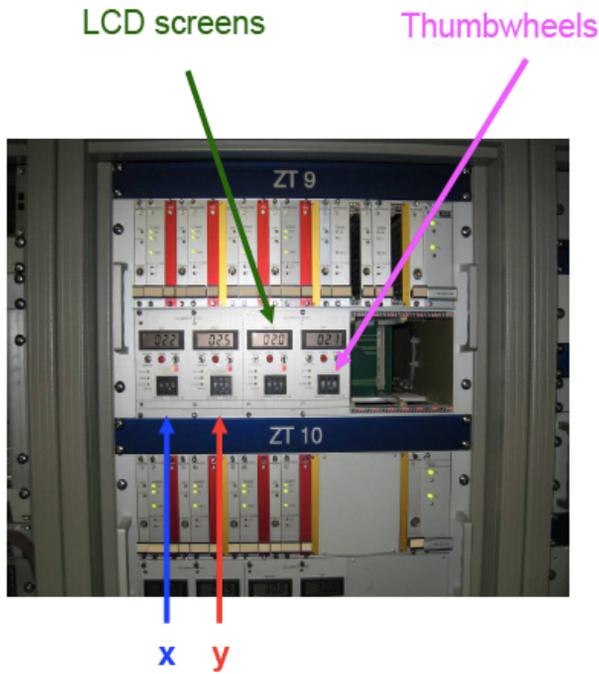
Beam: ZT9 / ZT9-EXP  
File: ZT9A.ZT9-EXP.010  
Momentum: +10 GeV/c  
Last timing: 09.12.2014 13:39:16  
Comment: T9 Test Beam +10 GeV/c

Rectifiers	CURRENT	BeamRef	TOL	MODE	POL	LOC	FAULT	Info	Comments
QDE1	406.2	406.3	0.4	ON	N			Def_Quad / ZT9.QDE01	
QFO2	353.3	353.3	0.4	ON	N			Foc_Quad / ZT9.QFO02	
BHZ1	893.1	893.3	0.4	ON	N			Hor.Bend / ZT9.BHZ01	
QFO3	290.2	290.1	0.4	ON	N			Foc_Quad / ZT9.QFO03	
BHZ2	245.4	245.4	0.4	ON	N			Hor.Bend / ZT9.BHZ02	
QFO4	153.5	153.6	0.4	ON	N			Foc_Quad / ZT9.QFO04	
BHZ3	238.5	239.0	0.4	ON	N			Hor.Bend / ZT9.BHZ03	set current Command Failed / <
QDE5	264.1	264.2	0.4	ON	N			Def_Quad / ZT9.QDE05	
BVT1	367.7	367.7	0.4	ON	N			Vert.Bend / ZT9.BVT01	
QDE6	448.9	449.0	0.4	ON	N			Def_Quad / ZT9.QDE06	
QFO7	463.9	464.0	0.4	ON	N			Foc_Quad / ZT9.QFO07	

Run Hold Refresh Refresh All Refresh Selected Set Current ON STANDBY OFF RESET Display F... Store to e...

Please select the magnet/rectifier affected and try Reset, Standby, On and Set current (or Set to BeamRef in the magnet status) until it works. In case you don't manage, call the PS operators in the CCC.

# Collimator control



Collimators can only be controlled locally from the racks in the EBCR.

If you want to select  $\pm X$  mm for the gap of the collimator, dial  $50+X/2$  on each of the two thumbwheels of the collimator in question and then push on the red strobe buttons. The collimator jaws will slowly move to the required positions, as indicated (in mm) on the LCD screens. Normally the horizontal collimator controls the momentum spread and the vertical one the vertical acceptance.

## Target control

The choice of target heat (4 or 6: electron enriched, 11 : hadrons) is made by the CCC, following discussion at the schedule meeting.

## Beam Files

Some pre-defined beam settings are available from the Beam File Browser:

Beam: ZT9 / ZT9-EXP      Last timing: 09.12.2014 13:43:35  
 File: ZT9A.ZT9-EXP.010      Momentum: +10 GeV/c      Comment: T9 Test Beam +10 GeV/c

Beamfiles	Comment	Particle type	Moment...	Experim...	Zone	Beam gener...	Initial En...	Interme...	Final En...	Last M...	Last Mo...	Creation	Invalid ...	Parent beam...
ZT9A.ZT9-EXP.001	T9 Test Beam +1.0 GeV/c	PION_PLUS	+1	ZT9-EXF	ZT9A	Secondary	1.0	0.0	0.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.002	T9 Test Beam +2.0 GeV/c	PION_PLUS	+2	ZT9-EXF	ZT9A	Secondary	2.0	0.0	0.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.003	T9 Test Beam +3.0 GeV/c	PION_PLUS	+3	ZT9-EXF	ZT9A	Secondary	3.0	0.0	0.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.004	T9 Test Beam +4.0 GeV/c	PION_PLUS	+4	ZT9-EXF	ZT9A	Secondary	4.0	0.0	0.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.005	T9 Test Beam +5.0 GeV/c	PION_PLUS	+5	ZT9-EXF	ZT9A	Secondary	5.0	0.0	0.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.006	T9 Test Beam +6.0 GeV/c	PION_PLUS	+6	ZT9-EXF	ZT9A	Secondary	6.0	0.0	0.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.007	T9 Test Beam +7.0 GeV/c	PION_PLUS	+7	ZT9-EXF	ZT9A	Secondary	7.0	0.0	0.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.008	T9 Test Beam +8.0 GeV/c	PION_PLUS	+8	ZT9-EXF	ZT9A	Secondary	8.0	0.0	0.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.009	T9 Test Beam +9.0 GeV/c	PION_PLUS	+9	ZT9-EXF	ZT9A	Secondary	9.0	0.0	0.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.010	T9 Test Beam +10 GeV/c	PION_PLUS	+10	ZT9-EXF	ZT9A	Secondary	10.0	0.0	0.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.011	T9 Test Beam -1.0 GeV/c	ELECTRON	-1	ZT9-EXF	ZT9A	Secondary	-1.0	0.0	-1.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.012	T9 Test Beam -2.0 GeV/c	ELECTRON	-2	ZT9-EXF	ZT9A	Secondary	-2.0	0.0	-2.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.013	T9 Test Beam -3.0 GeV/c	ELECTRON	-3	ZT9-EXF	ZT9A	Secondary	-3.0	0.0	-3.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.014	T9 Test Beam -4.0 GeV/c	ELECTRON	-4	ZT9-EXF	ZT9A	Secondary	-4.0	0.0	-4.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.015	T9 Test Beam -5.0 GeV/c	ELECTRON	-5	ZT9-EXF	ZT9A	Secondary	-5.0	0.0	-5.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.016	T9 Test Beam -6.0 GeV/c	ELECTRON	-6	ZT9-EXF	ZT9A	Secondary	-6.0	0.0	-6.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.017	T9 Test Beam -7.0 GeV/c	ELECTRON	-7	ZT9-EXF	ZT9A	Secondary	-7.0	0.0	-7.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.018	T9 Test Beam -8.0 GeV/c	ELECTRON	-8	ZT9-EXF	ZT9A	Secondary	-8.0	0.0	-8.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.019	T9 Test Beam -9.0 GeV/c	ELECTRON	-9	ZT9-EXF	ZT9A	Secondary	-9.0	0.0	-9.0	2014/1	matagu	2014/		
ZT9A.ZT9-EXP.020	T9 Test Beam -10 GeV/c	ELECTRON	-10	ZT9-EXF	ZT9A	Secondary	-10.0	0.0	-10.0	2014/1	matagu	2014/		

View / Edit    Compare    Copy    Delete    Refresh

BeamRefs->Selected File    Load Beamfile    Extrapolate

A Beam File is a list of currents. You may select a file and Load it (i.e. activate it). After beam tuning you may save the settings by 'BeamRefs -> Selected File'. You may also create a new file at a different energy by the Extrapolate button.

# MONITORING YOUR BEAM IN THE EAST AREA

## The beam intensity

The primary beam, as well as the primary production target are controlled by the CCC operators (tel. 76677). You may check the quality of the incident proton beam via the Scintillator status:

Scintillators	Count	Normalized ...	Norm count ...	Coincidence	Coinc. count	HV	HV BeamRef	Pos	Info	Comments
TELE	2.131E+04	2.131E+04	1.000E+00	XTEL F61N-2	5.994E+03	-1882		NOT_INS	90 deg telescope	
SCINT1	8.329E+04	8.329E+04	1.000E+00	XSCI T9 055	8.030E+04	-1763		IN	Scintillator	

The TELEscope reading is an indication of how much beam hits the primary target properly. A good reading is above  $2 \cdot 10^4$  ppp.

The SCINT1 reading gives the intensity of the beam at the end of the line. The EXPT scaler status shows the reading of the experimental scalers. You may provide NIM signals from your own detectors to the beam control system via patch panels in your control room.

## The beam profile

The Delay Wire Chamber Profile knob shows the horizontal and vertical beam profiles at the end of the beam line.

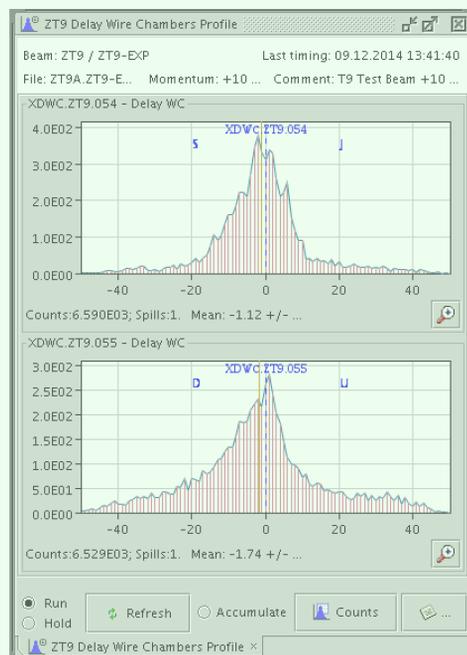
The scale is in millimeters.

Eg. in T9.

The steering can be adjusted with **the last BHZ** and with **BVT1**.

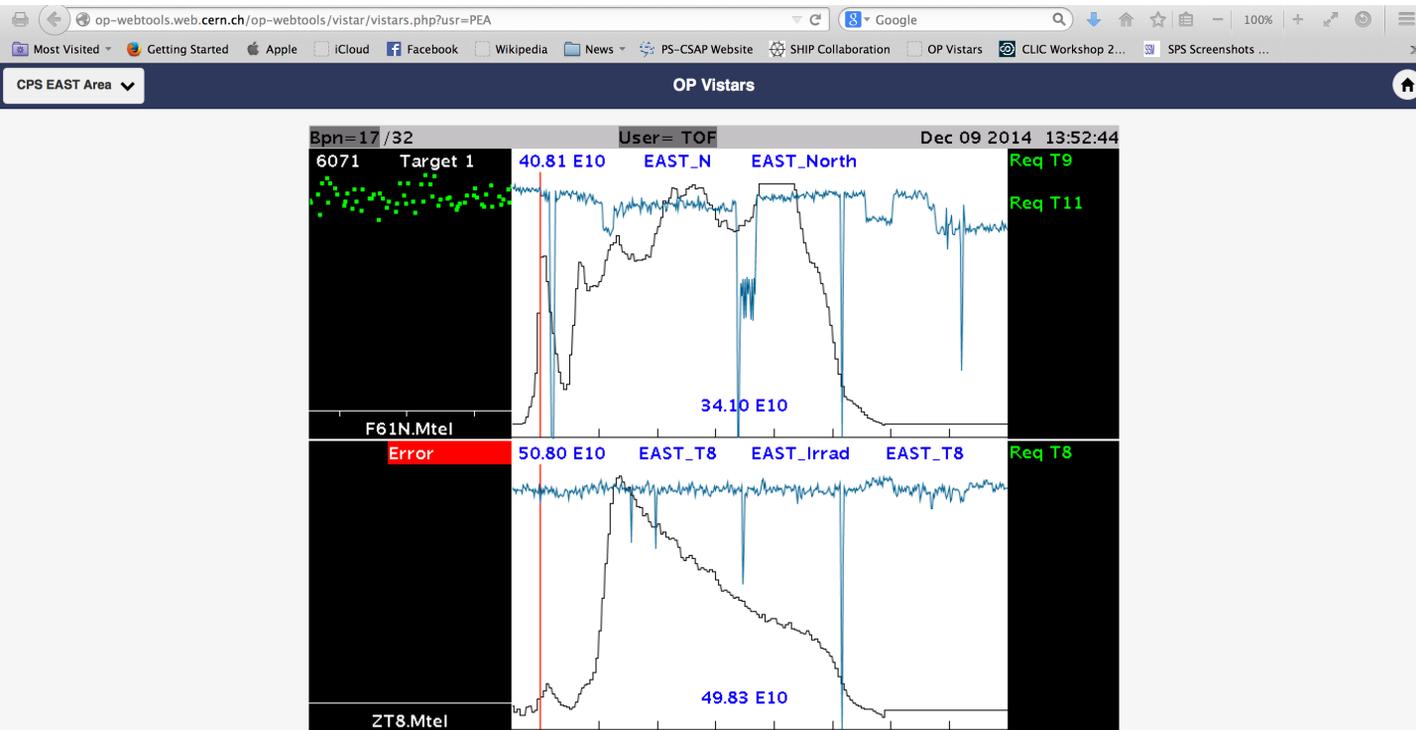
If you move the focus far downstream (with the last two quadrupoles, see the listings in the control room)), the profile in the XDWC will quickly get very wide!

The DWC status panel shows the status, but adjustments are reserved to the experts.



# The VISTAR pages

A VISTAR pages is available from the Web or on the TV screen in the control rooms:



The curve shows the time distribution of the incident protons over the 400 msec spill. The green dots show the recent history of TELEscope readings. Above the dots the primary target head number is shown. Head 0 indicates a problem. On the right hand side the status of the beam stoppers is shown. Another page shows the overall PS status:

