

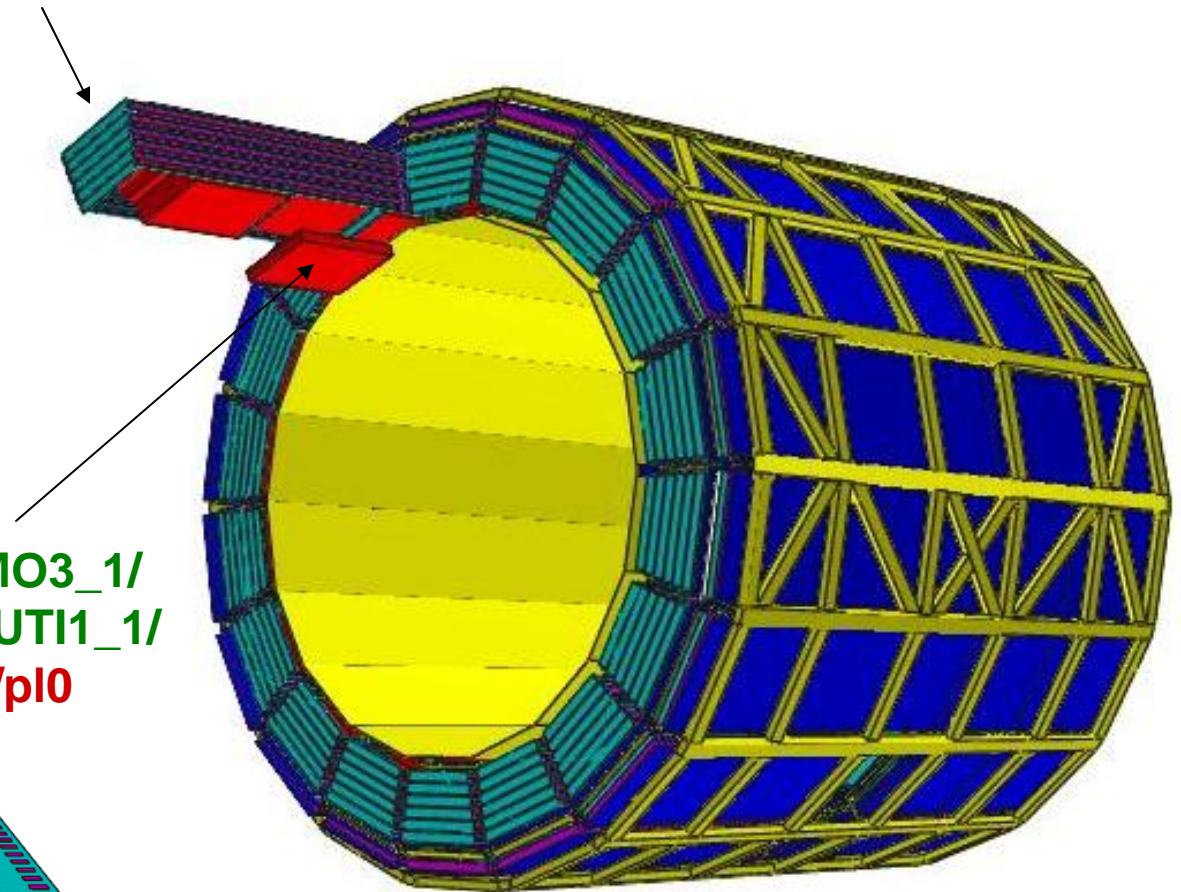
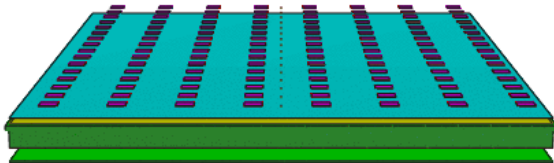
TRD surveys

2006, 2008, 2009

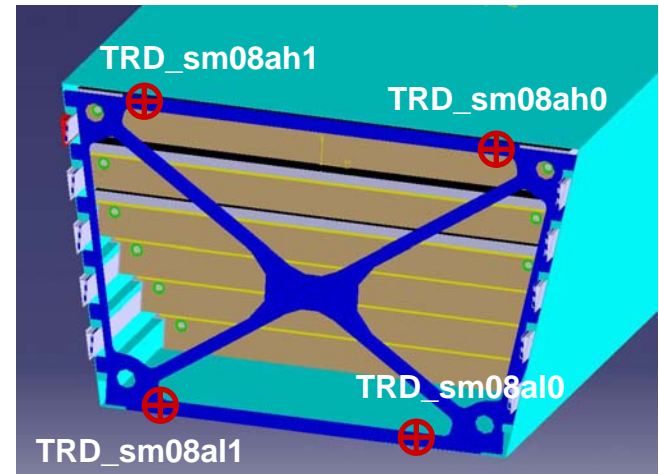
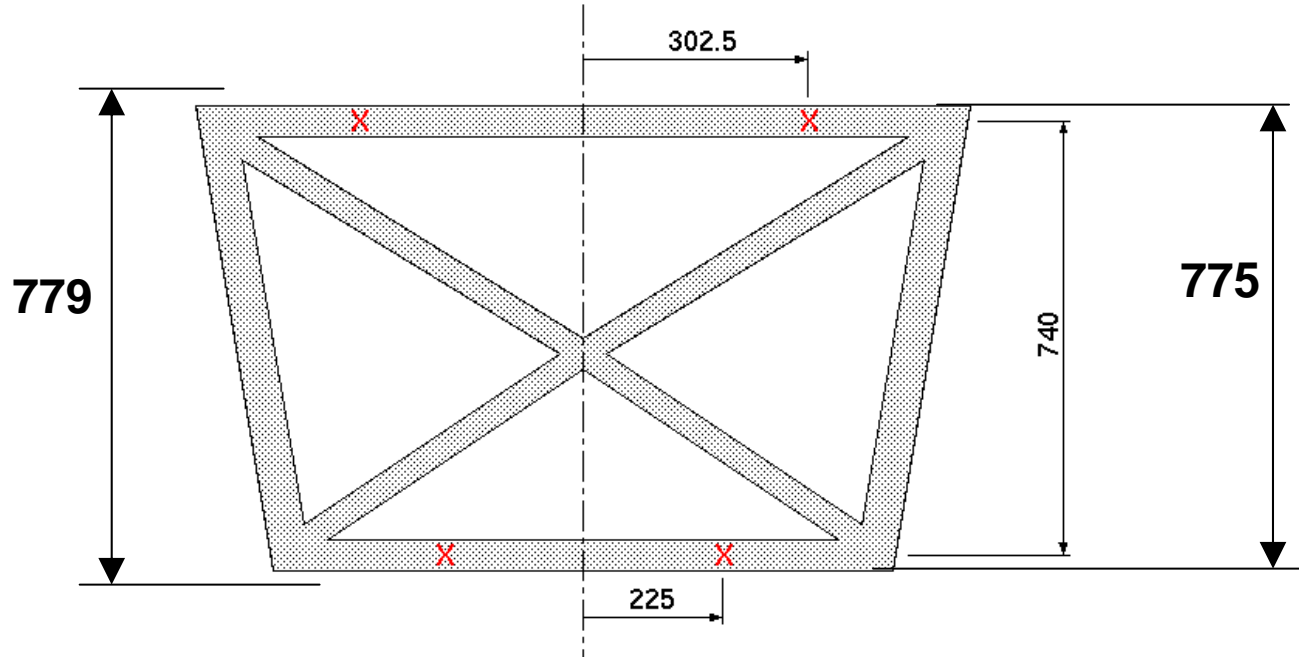
alignable volumes in TRD

18 TRD supermodules
like **ALIC_1/B077_1/BSEGM03_1/BTRD3_1**
aka **/TRD/sm03**
aligned by survey

540 TRD chambers
like **ALIC_1/B077_1/BSEGM03_1/
BTRD3_1/UTR1_1/UTS1_1/UTI1_1/
UT18_1** aka **/TRD/sm03/st3/pl0**
aligned with tracks



4 surveys marks on the A-side of each supermodule



Brief history of TRD supermodules, as of Nov 2009

2006	2007		2008		2009
SM I caliper survey insert Sec 8 survey				survey cosmics	disass. CERN repair GSI ass. Münster
SM II	assembled in Münster	CERN	insert Sec 0		disass. CERN repair GSI ass. Münster
SM III	assembled in Münster	CERN test PS	repair CERN/GSI	cosmics Münster	CERN insert Sec 7
SM IV		assembled in Münster	repair CERN	insert Sec 9 survey cosmics	
SM V			assembled in Münster	insert Sec 17 survey cosmics	
SM VI				assembled in Münster	insert Sec 1

Brief history of TRD supermodules, as of Nov 2009

	2007	2008	2009
survey			
	assembled in Münster CERN	insert Sec 0	disass. CERN repair GSI ass. Münster
	assembled in Münster CERN test PS	repair CERN/GSI	disass. CERN repair GSI ass. Münster
	assembled in Münster	repair CERN	insert Sec 0 insert Sec 7
	assembled in Münster	insert Sec 9	
	assembled in Münster	insert Sec 17	
		assembled in Münster	insert Sec 1

survey
cosmics

cosmics
Münster

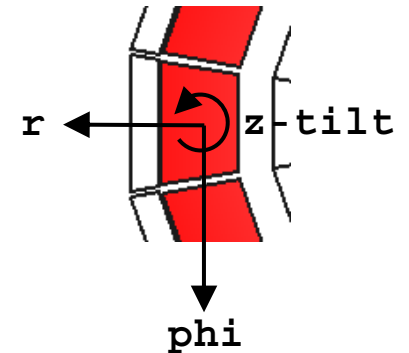
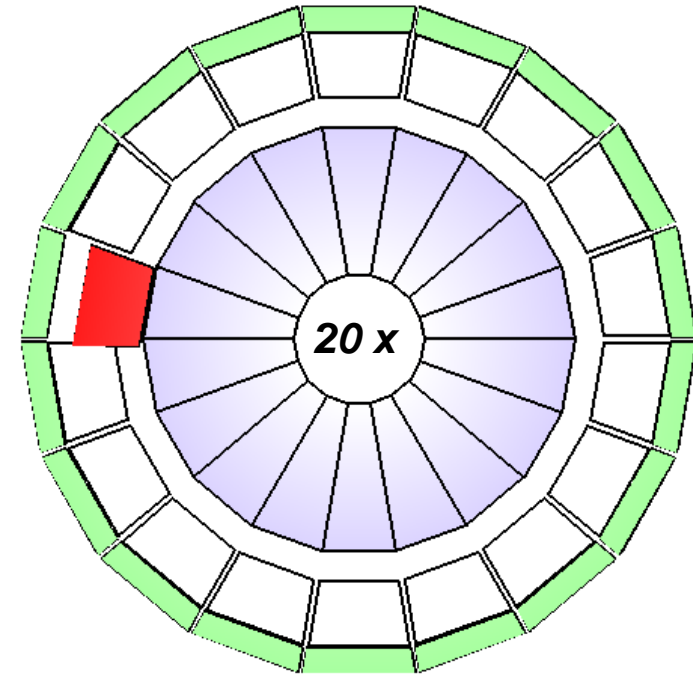
survey
cosmics

survey
cosmics

survey August 2009
cosmics

TRD survey in December 2006

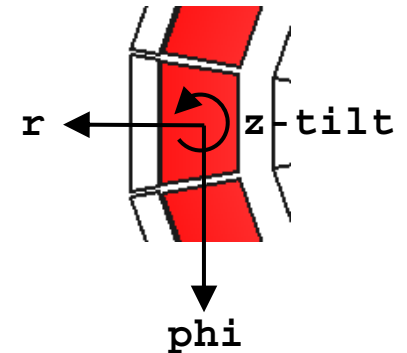
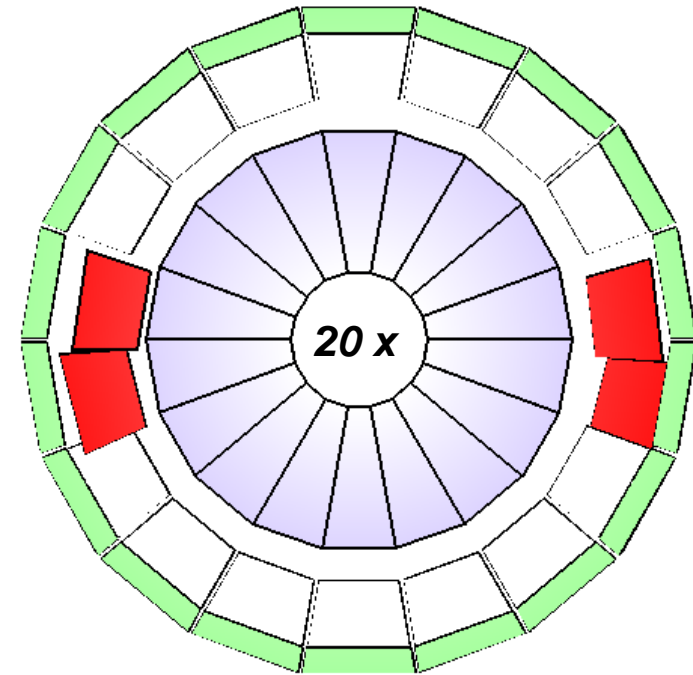
SM	phi-shift	z-shift	r-shift	z-tilt
00				
01				
02				
03				
04				
05				
06				
07				
08	0.30(160)	0.09(100)	-1.55(100)	-0.03(189)
09				
10				
11				
12				
13				
14				
15				
16				
17				



Only A-side measured
 Results translated into shifts/tilts
 Only shifts and z-tilt allowed
 Shifts in cm, tilts in degrees

TRD survey in June 2008

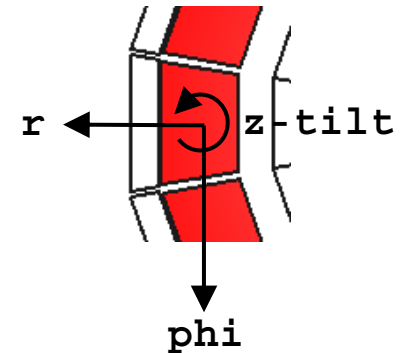
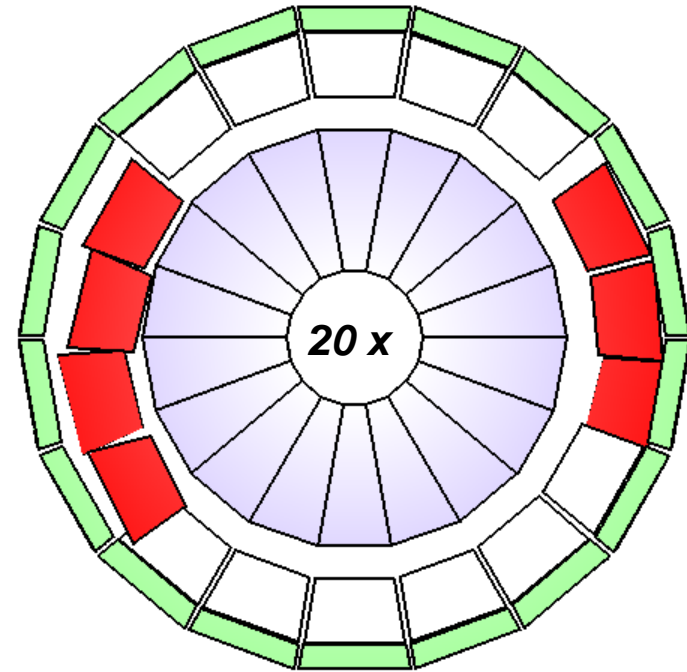
SM	phi-shift	z-shift	r-shift	z-tilt
00	-1.20(7)	-0.31(7)	-0.51(7)	-0.17(9)
01				
02				
03				
04				
05				
06				
07				
08	0.51(7)	-0.26(7)	-1.45(7)	0.04(9)
09	0.68(9)	0.10(8)	-0.82(8)	0.22(11)
10				
11				
12				
13				
14				
15				
16				
17	-1.00(9)	-0.75(8)	0.26(8)	-0.21(11)



Only A-side measured
 Results translated into shifts/tilts
 Only shifts and z-tilt allowed
 Shifts in cm, tilts in degrees

TRD survey in August 2009

SM	phi-shift	z-shift	r-shift	z-tilt
00	-1.42(9)	-1.22(8)	-0.03(8)	-0.25(11)
01	-1.34(9)	-1.34(8)	-0.17(8)	-0.22(11)
02				
03				
04				
05				
06				
07	0.35(9)	-0.52(8)	-1.37(8)	-0.00(11)
08	0.66(9)	-1.53(8)	-1.63(8)	-0.18(11)
09	0.88(9)	0.13(8)	-0.83(8)	0.20(11)
10	1.21(9)	1.40(8)	-0.81(8)	-0.21(11)
11				
12				
13				
14				
15				
16				
17	-1.11(9)	-0.83(8)	0.34(8)	-0.22(11)



Only A-side measured
 Results translated into shifts/tilts
 Only shifts and z-tilt allowed
 Shifts in cm, tilts in degrees

surveys 2006, 2008, 2009

- 🌐 **displacements by up to 1.6 cm observed, mostly downwards**
- 🌐 **from 2008 to 2009:**
 - SM09 went down by 0.20(13) cm**
 - SM17 went down by 0.11 (13) cm**
 - (not significant)**


backup

processing survey data with AliTRDalignment

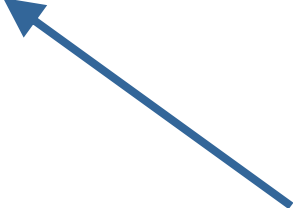
alignment params of supermodule 08 deduced from Dec-2006 survey
using aliroot from 2007

phi-shift	z-shift	r-shift	phi-rot	z-rot	r-rot
0.279	0.085	-2.224	0.000	0.000	0.000
± 0.300	± 0.300	± 0.300	± 0.000	± 0.000	± 0.000

(only translations)


*phi: 0.3 cm
to larger phi i.e.
downward*


*z: 0.1 cm
away from
muon arm*


*r: 2.2 cm
inward*

processing survey data with AliTRDalignment

alignment params of supermodule 08 deduced from Dec-2006 survey
using aliroot from 2008

phi-shift	z-shift	r-shift	phi-rot	z-rot	r-rot
0.279	0.085	-1.554	0.000	0.000	0.000
±1.000	±1.000	±1.000	±0.000	±0.000	±0.000

(only translations)

↑
*phi: 0.3 cm
to larger phi i.e.
downward*

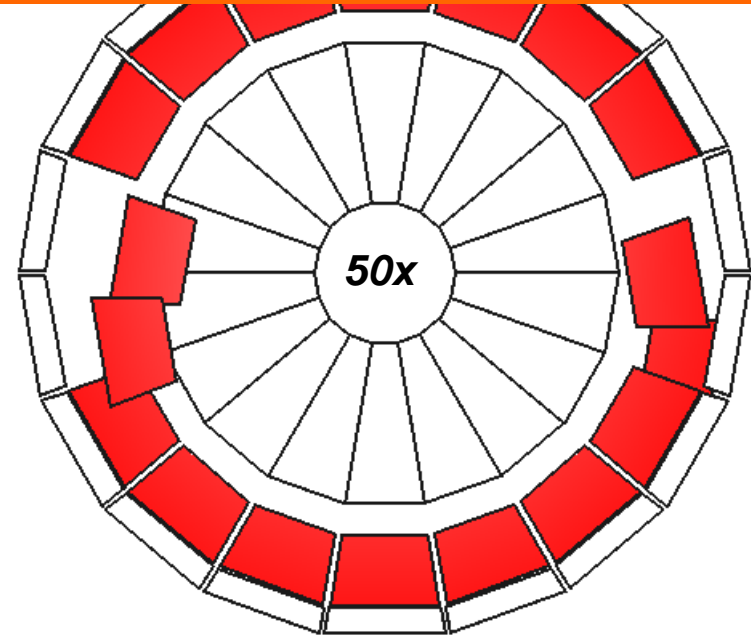
↑
*z: 0.1 cm
away from
muon arm*

↑
*r: 1.6 cm
inward*

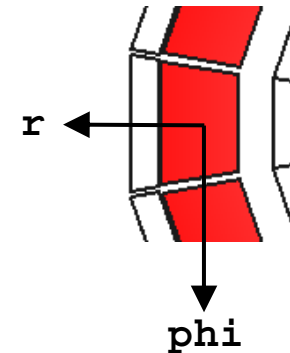
geometry modification partly absorbs the r-shift

TRD survey June 2008

Only A-side measured
Results translated into shifts
Only shifts allowed
Shifts are in cm

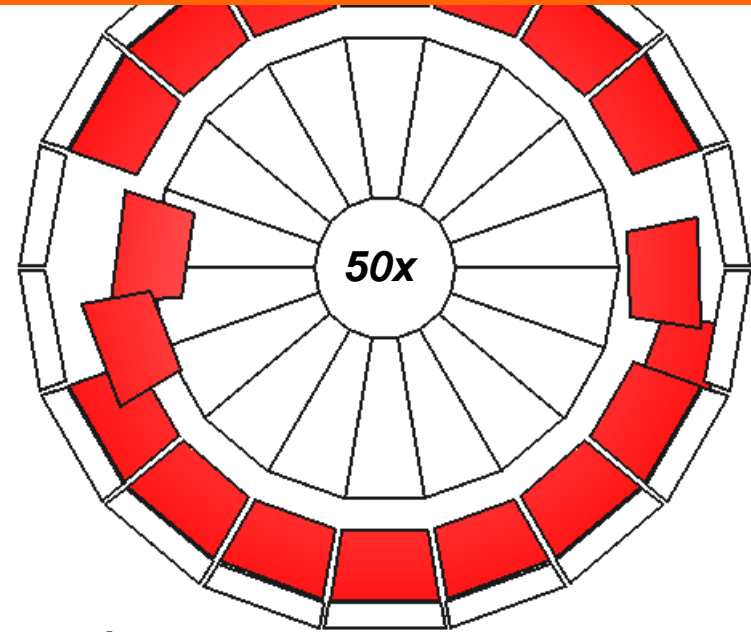


SM	phi-shift	z-shift	r-shift
00	-1.197	-0.307	-0.510
	± 0.071	± 0.071	± 0.071
08	0.510	-0.260*	-1.453
	± 0.071	± 0.071	± 0.071
09	0.628	0.100	-0.854
	± 0.082	± 0.082	± 0.082
17	-0.953	-0.750	0.223
	± 0.082	± 0.082	± 0.082

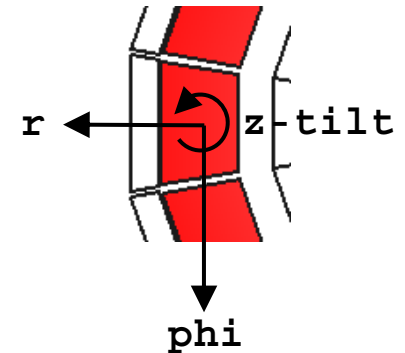


TRD survey June 2008, with z-tilt

Only A-side measured
 Results translated into shifts/tilts
 Only shifts and z-tilt allowed
 Shifts in cm, tilts in degrees



SM	phi-shift	z-shift	r-shift	z-tilt
00	-1.196 ±0.071	-0.308 ±0.071	-0.510 ±0.071	-0.168 ±0.089
08	0.510 ±0.071	-0.260* ±0.071	-1.453 ±0.071	0.040 ±0.089
09	0.675 ±0.085	0.100 ±0.082	-0.815 ±0.084	0.220 ±0.111
17	-0.997 ±0.085	-0.750 ±0.082	0.259 ±0.084	-0.208 ±0.111



Alignable volumes in TRD

18 TRD supermodules
like **/TRD/sm03**
aligned by survey

540 TRD chambers
like **/TRD/sm03/st3/pl0**
aligned with tracks

