

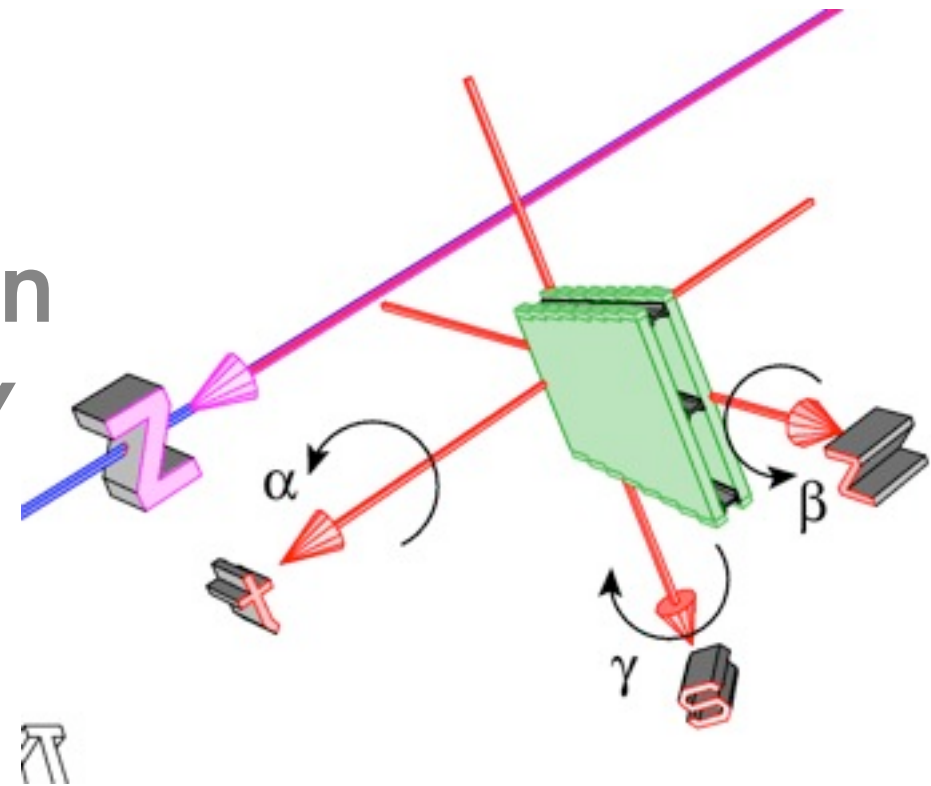
TGC A-lines

- Felix R./ MCP re-processing with TGC A_lines
- <https://twiki.cern.ch/twiki/bin/view/AtlasProtected/MCP2010Data15GeVCombinedMuonSkim>
- 2010-12-14 (same as 2010-11-19 but with the following tag overrides):
 - Folder - Tag
 - ✓ /MUONALIGN/TGC/SIDEA
 - ❖ MuonAlignTGCEndCapAAlign-TEST-01
 - ✓ /MUONALIGN/TGC/SIDEC
 - ❖ MuonAlignTGCEndCapCAAlign-TEST-01
 - from the logs: TGC A-lines are loaded by MuonGeoModel & Amdc/Muonboy

MuonAlignTGCEndCapAAlign-TEST-01

			s,	z,	t,	rot_s=γ, rot_z=β, rot_t=α																
Corr: T1E	1	3	1	0.000	-10.739	11.512	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	-999.000	-999.
Corr: T1E	1	3	2	0.000	-3.989	15.133	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	-999.000	-999.
Corr: T1E	1	3	3	0.000	0.068	13.640	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	-999.000	-999.
Corr: T1E	1	3	4	0.000	0.649	17.530	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	-999.000	-999.
Corr: T1E	1	4	1	0.000	-7.645	11.275	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	-999.000	-999.
Corr: T1E	1	4	2	0.000	-3.813	9.812	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	-999.000	-999.
Corr: T1E	1	4	3	0.000	-7.981	11.999	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	-999.000	-999.
Corr: T1E	1	4	4	0.000	-11.722	17.230	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	-999.000	-999.
Corr: T1F	1	3	1	0.000	-8.467	10.102	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	-999.000	-999.
Corr: T1E	1	5	1	0.000	-11.221	13.729	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	-999.000	-999.
Corr: T1E	1	5	2	0.000	-10.487	16.065	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	-999.000	-999.

Test production:
TGC A-lines correct position in
global z and global R ONLY



TGC A-lines

- new production - not documented under
- <https://twiki.cern.ch/twiki/bin/view/AtlasProtected/MCP2010Data15GeVCombinedMuonSkim>
- Folder - Tag
 - /MUONALIGN/TGC/SIDEA/C
 - ❖ MuonAlignTGCEndCapA/CAlign-REPRO-2010-03

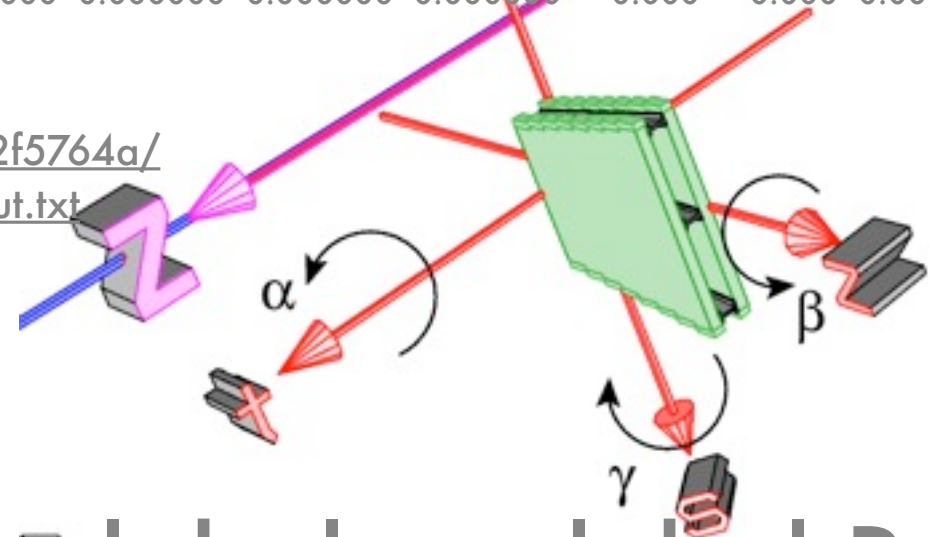


MuonAlignTGCEndCapAAlign- REPRO-2010-03

				s,	z,	t,	rot_s=γ, rot_z=β, rot_t=α												
Corr: T3E	4	-3	4	0.000	-2.675	-0.386	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000
Corr: T3E	4	-3	5	0.000	-6.188	1.982	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000
Corr: T3E	4	-4	1	0.000	1.254	-15.881	0.001209	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000
Corr: T3E	4	-4	2	0.000	0.737	-4.885	-0.000878	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000
Corr: T3E	4	-4	3	0.000	-7.872	-15.853	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000
Corr: T3E	4	-4	4	0.000	-5.164	-9.114	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000
Corr: T3E	4	-4	5	0.000	-5.654	-2.238	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000
Corr: T3F	4	-6	1	0.000	0.008	-12.085	-0.002008	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000
Corr: T3E	4	-5	1	0.000	0.227	-11.899	0.000233	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000
Corr: T3E	4	-5	2	0.000	-1.103	-9.123	0.000230	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000
Corr: T3E	4	-5	3	0.000	-0.681	-3.837	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000
Corr: T3E	4	-5	4	0.000	1.713	-4.817	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000
Corr: T3E	4	-5	5	0.000	0.167	-8.197	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000
Corr: T3E	4	-6	1	0.000	-3.939	-20.243	0.001585	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000
Corr: T3E	4	-6	2	0.000	-8.494	-14.993	0.001233	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000000	0.000	0.000	0.000000	0.000000	0.000

example log file:

http://voatlas21.cern.ch:25980/monitor/logs/ee17ff8d-cf5d-4687-b401-c8e702f5764a/tarball_PandaJob_1199222051_ANALY_LONG_BNL_ATLAS/athena_stdout.txt



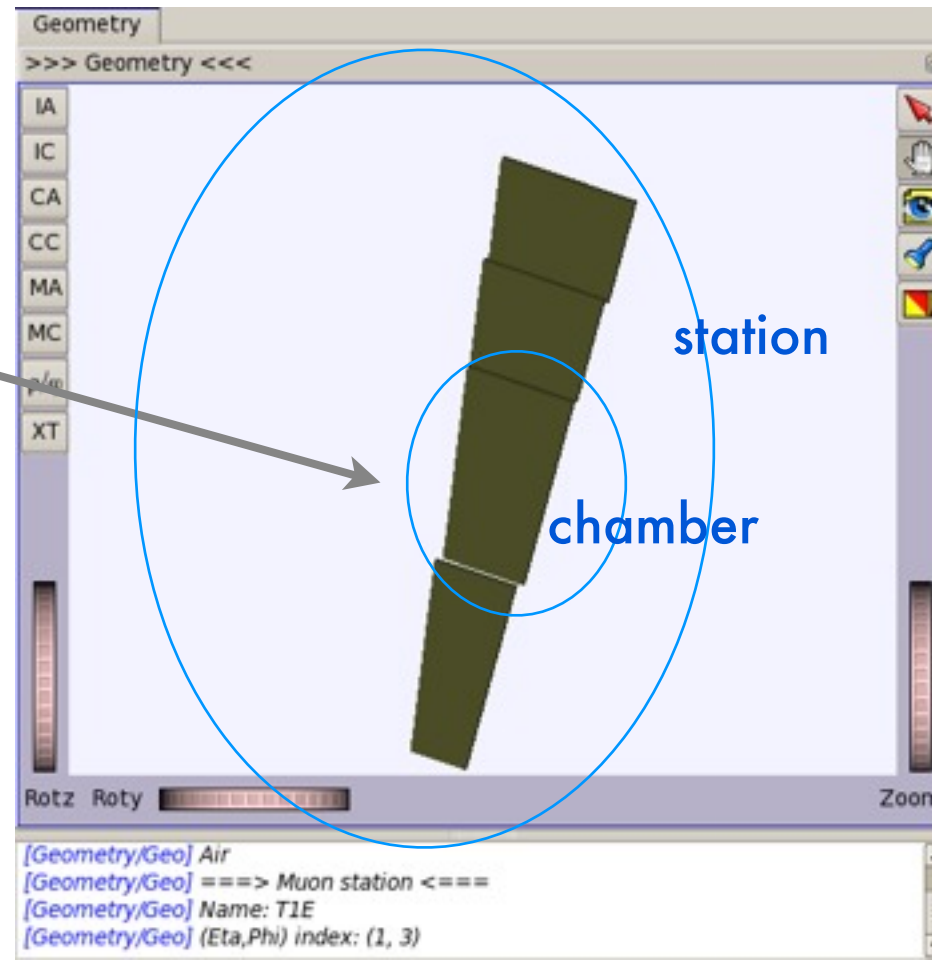
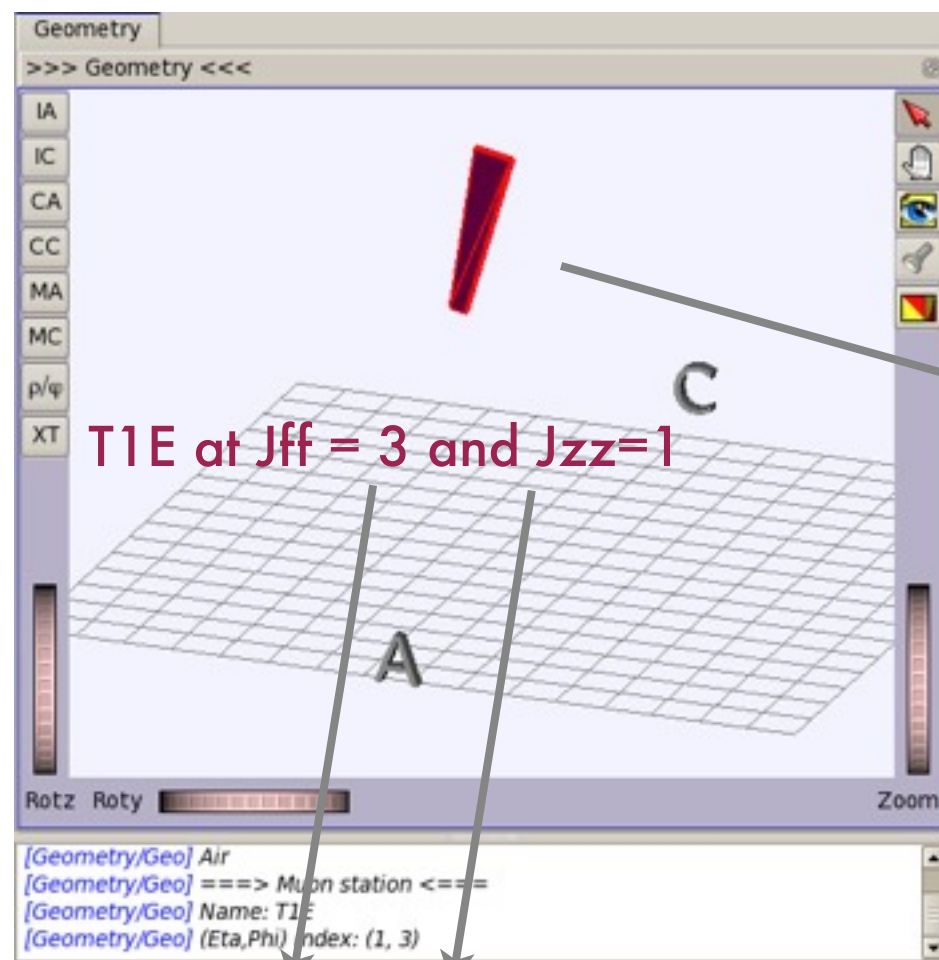
New production:
TGC A-lines correct position in global z, global R **and** γ
ROTATIONS in TGC A-lines are not certified to work !

A-line implementation gotchas

- A-lines are well validated, so far, for Muon Station (MDT stations & CSC stations)
 - critical points: convention on the order of rotations & translations + **definition of the local frame where the A-line transform is applied**
 - Muon Stations are defined, according to Amdb, as set of components
 - 1 station in the barrel = 2 multilayers typically + a number of RPC modules
 - 1 MDT station in the endcaps = 2 multilayers - easiest case
 - 1 TGC station in Detector Description is a set of chambers at different global R and same global ϕ
- ✓ **what's the local frame where the transform is applied ??**

A-line implementation gotchas

Concentrate on $\gamma \neq 0$ only for T1E at $J_{ff} = 3$ and $J_{zz} = 1$



T1E at $J_{ff} = 3$ and $J_{zz}=1$

P T1E 1 11111111 1 -11.250 13450.5

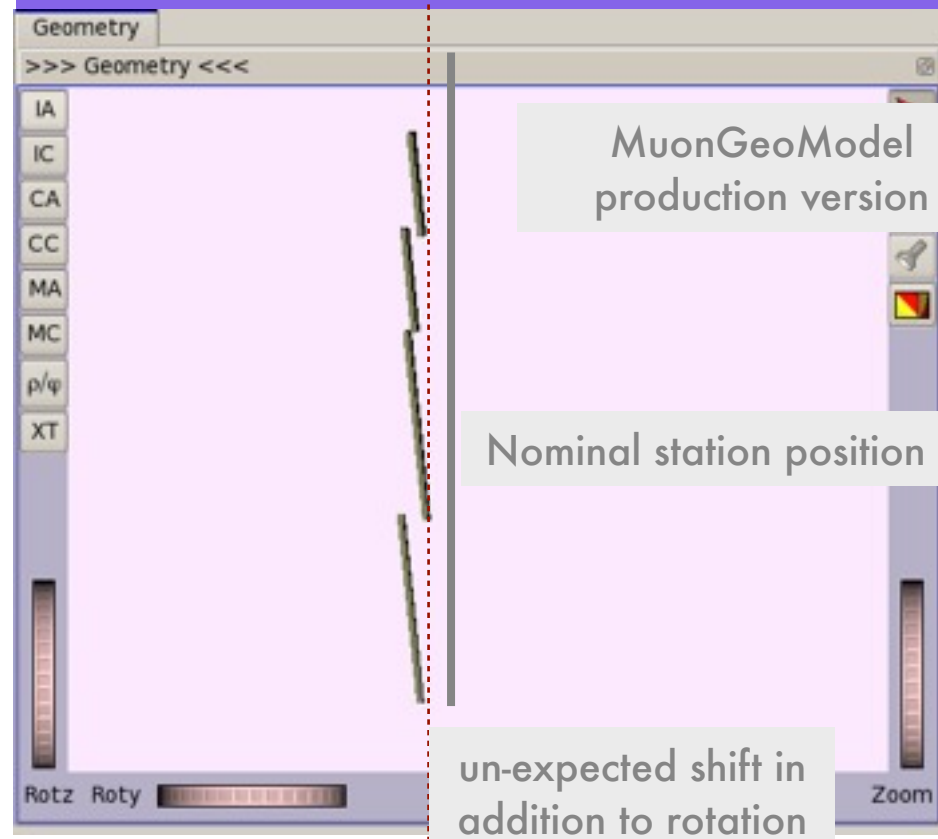
0.0 0.0 0.0 0.0 0.0

T1E station definition: 4 components

D T1E 1 4

0.000	3880.0	79.0	1	TGC	2	0	624.9	921.2	2260.5	0.0	0.0
0.000	6054.5	0.0	2	TGC	3	0	918.0	1215.1	2266.5	0.0	0.0
0.000	8294.0	79.0	3	TGC	4	0	1216.5	1380.4	1250.0	0.0	0.0
0.000	9432.0	0.0	4	TGC	5	0	1364.7	1528.5	1250.0	0.0	0.0

A-line implementation gotchas



MuonGeoModel
production version

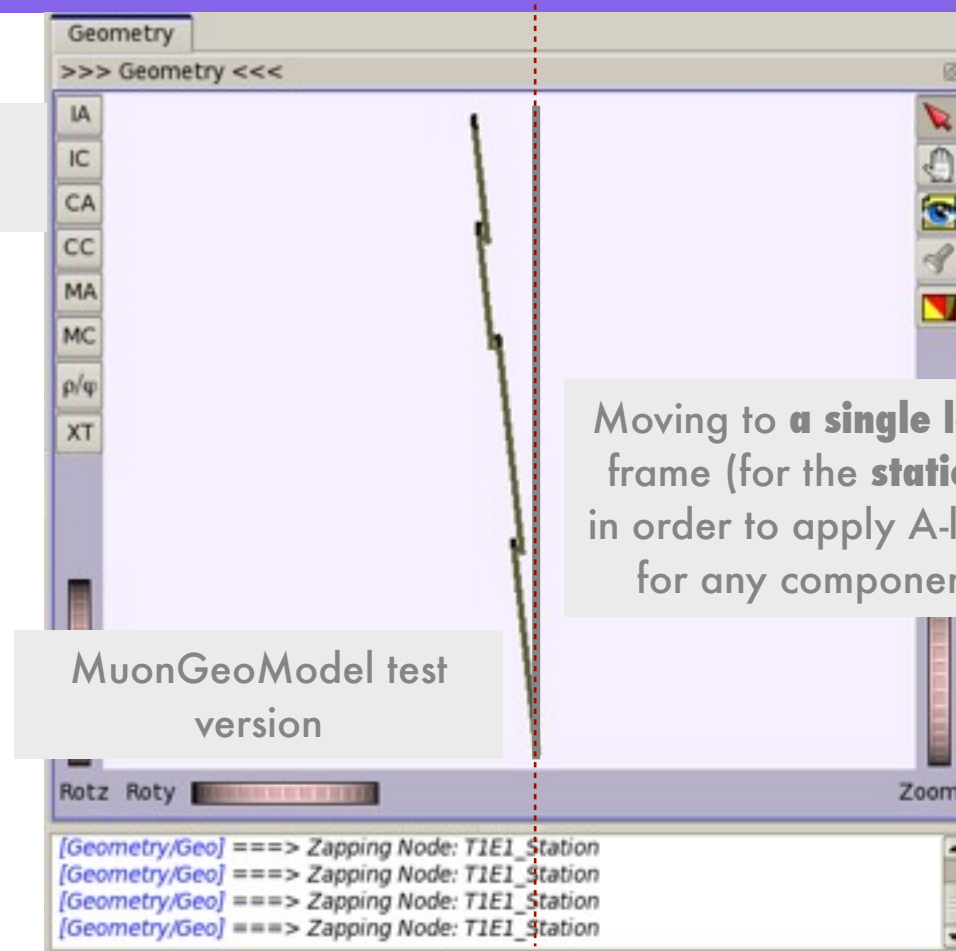
Nominal station position

un-expected shift in
addition to rotation

Current MuonGeoModel

transform applied in a
specific local frame for
each **chamber**
(this local frame is not
fully amdb-like - rotations
around the center of the
chamber)

something is inconsistent



MuonGeoModel test
version

Moving to a **single local**
frame (for the **station**)
in order to apply A-lines
for any component

Another possible implementation

Good implementation,
but need TGC A-lines
defined in such frame

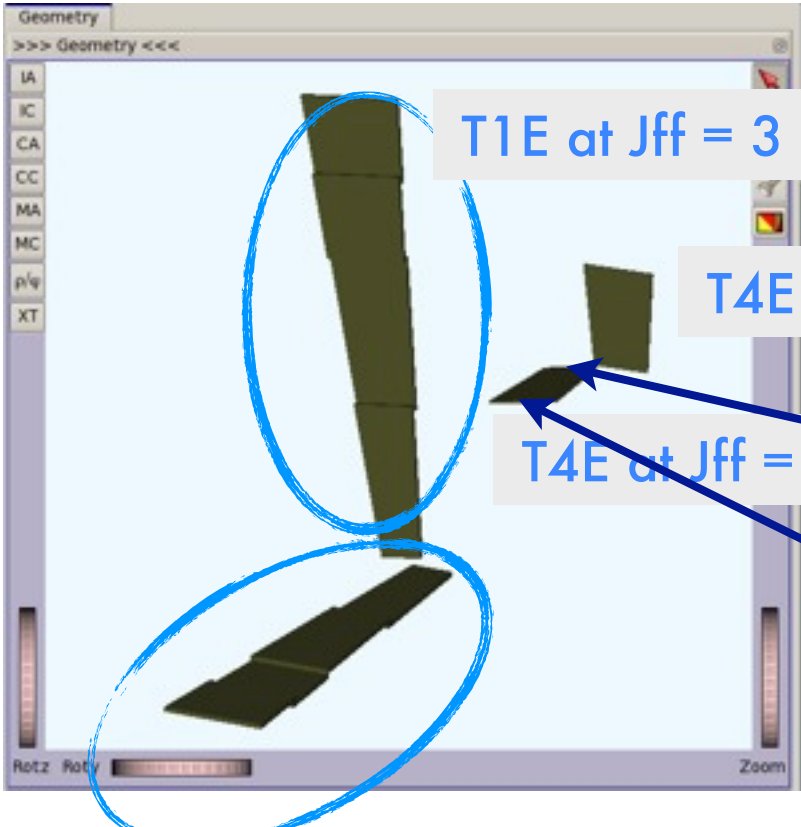
Concentrate on $\gamma \neq 0$ only for T1E at $J_{ff} = 3$ and $J_{zz} = 1$

					s,	z,	t,	rot_s= γ ,	rot_z= β ,	rot_t= α
A	T1E	3	1	1	0.000	0.	0.	0.100000	0.000000	0.000000
A	T1E	3	1	2	0.000	0.	0.	0.100000	0.000000	0.000000
A	T1E	3	1	3	0.000	0.	-0.	0.100000	0.000000	0.000000
A	T1E	3	1	4	0.000	0.	0.	0.100000	0.000000	0.000000

MuonReadoutGeometry vs Amdc

- current MuonReadoutGeometry and Amdc do not agree as soon as angles in THC a-lines appear...
- Current MGM implementation *pretends* to apply A-lines for components in the component (instead of station) szt frame - but the implementation is buggy
 - (i.e. the component szt frame is not really well defined)
- What's the Amdc “principle” choice ?
- Are we sure we agree for TGC A-lines for stations ?
- Can we compare Amdc and MGM with A-lines for components being applied in the common (already well understood) station szt frame ?
- **Are current TGC A-lines quoted in the assumption of being applied in the chamber szt frame of station szt frame ?**
- Amdc vs MRG check in Muonboy disabled for TGC ??? why production with $\gamma \neq 0$ is not crashing ???

one step back: TGC A-lines for stations



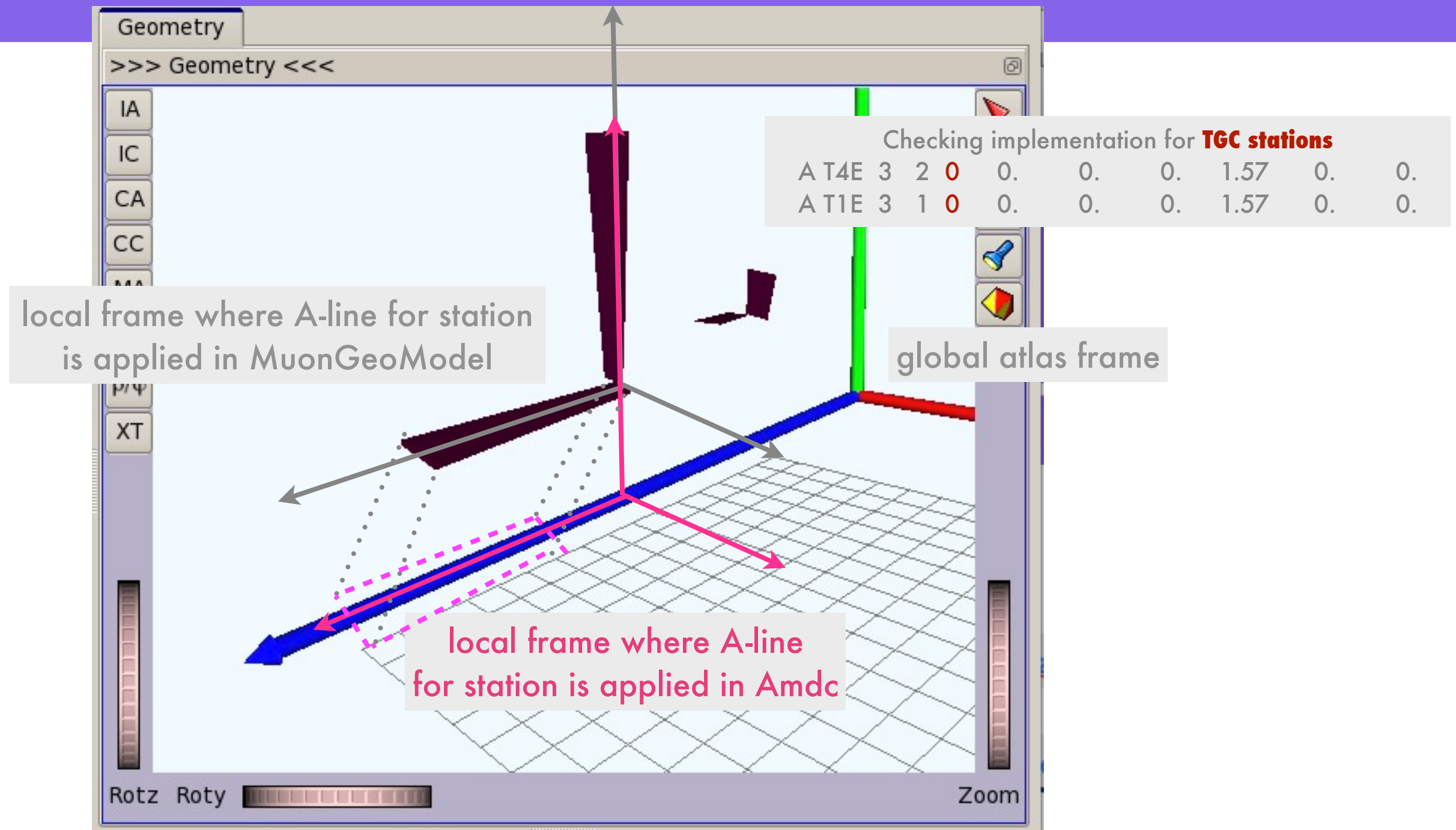
Checking implementation for **TGC stations**

A T4E	3	2	0	0.	0.	0.	1.57	0.	0.
A T1E	3	1	0	0.	0.	0.	1.57	0.	0.

*StNa/Name/Eta/Phi/GG	/IsSt/Chann/	48	T4E	1	7			1	0	1
Jtyp/Name/Jzz/Jff/ Job/ Jspli/Jsl/Jsz /Jstri/	49	T4E	2	3	1	1	1	2	1	
GM/Am/GM-Am/X										
Y	4691.934	-4.323	4696.257							
Z	7418.307	12118.305	-4699.998	<=====						
S	-0.000	0.000	-0.000							
T	4691.934	-4.323	4696.257	<=====						
										WARNING ! (precise Measurement)
*StNa/Name/Eta/Phi/GG	/IsSt/Chann/	48	T4E	1	7			1	0	24
Jtyp/Name/Jzz/Jff/ Job/ Jspli/Jsl/Jsz /Jstri/	49	T4E	2	3	1	1	1	2	24	
GM/Am/GM-Am/X										
Y	4693.060	-3.197	4696.257							
Z	8832.206	13532.204	-4699.998	<=====						
										WARNING !
S	-0.000	0.000	-0.000							
T	4693.060	-3.197	4696.257	<=====						
										WARNING ! (precise Measurement)

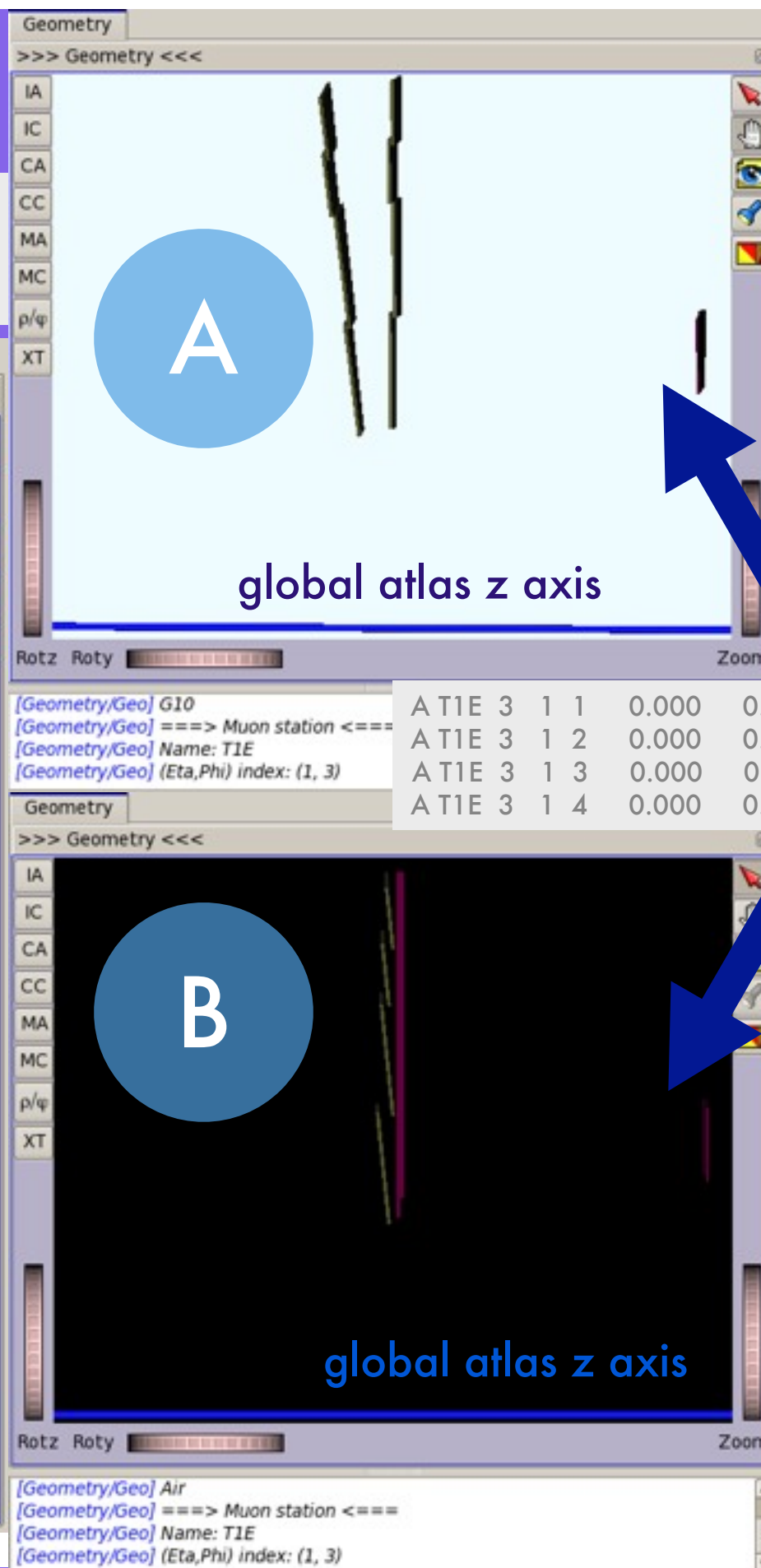
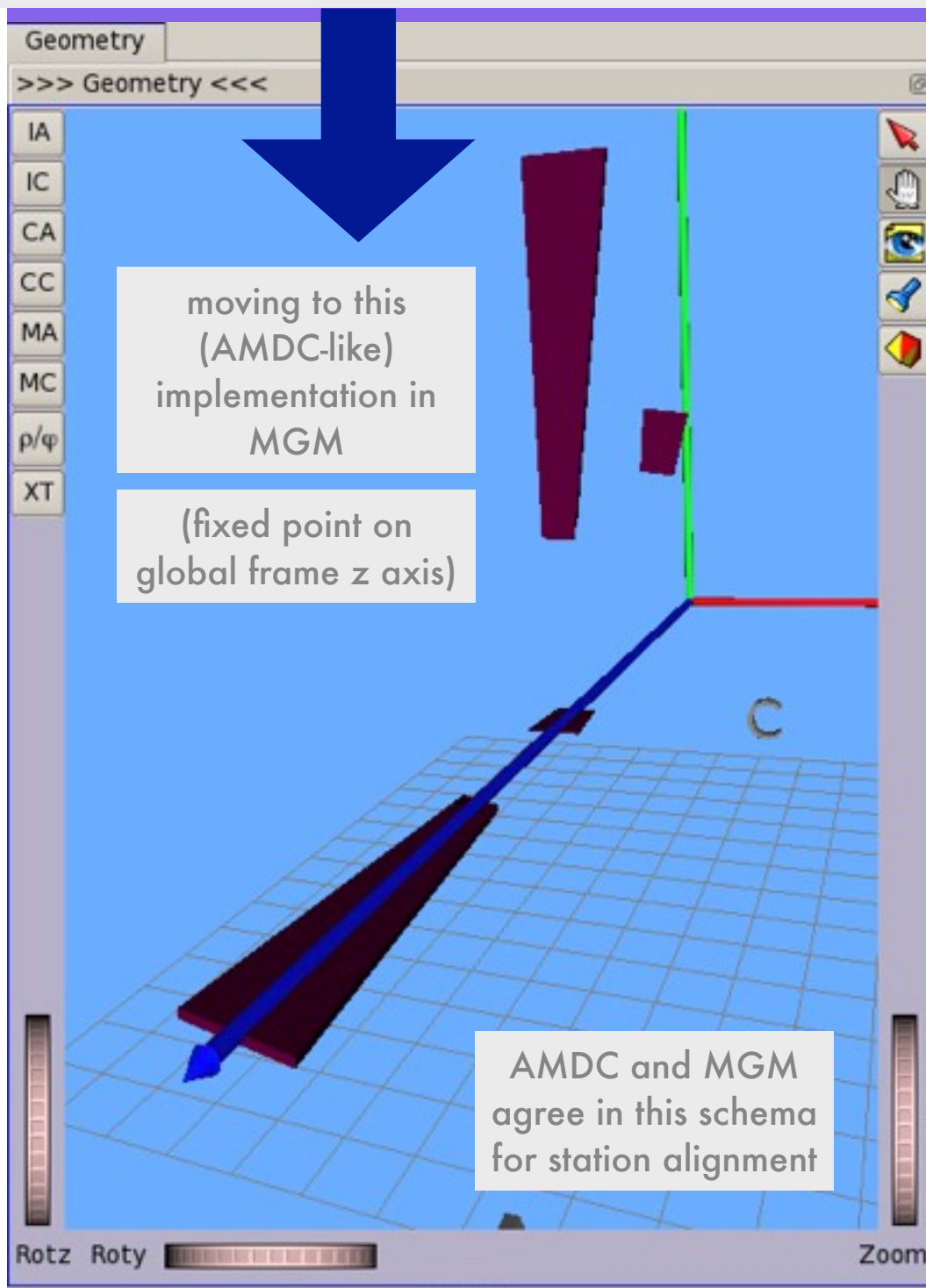
first
and
last
wire
gang

one step back: TGC A-lines for stations



Checking implementation for **TGC stations**

A	T4E	3	2	0	0.	0.	0.	1.57	0.	0.
A	T1E	3	1	0	0.	0.	0.	1.57	0.	0.



```
MuonStation::setDelta_fromAline_forComp(int jobindex, ...
.....
```

```
HepTransform3D childToLocAmdbComponent;
HepTransform3D childToLocAmdbStation =
    HepTransform3D(*_native_to_amdbl)*
    HepTransform3D(parentToChildT);
HepTransform3D locAmdbStatToLocAmdbComp =
    HepTransform3D::Identity;
if (getStationType().substr(0,3)=="T")
    locAmdbStatToLocAmdbComp =
        HepTranslateY3D(-Rcomp)*HepTranslateZ3D(-DZcomp);
childToLocAmdbComponent =
    locAmdbStatToLocAmdbComp*childToLocAmdbStation;

// setting delta transform
parentToChild->setDelta(childToLocAmdbComponent.inverse() *
    delta_amdb *
    childToLocAmdbComponent);
```

Are Jun's A-Lines intended to produce A or B or yet another situation if the values are as in the example ?

