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Subject: geometry overlaps for PANDA subdetectors  
Posted by [Maria Patsyuk](#) on Thu, 18 Jul 2013 10:49:09 GMT  
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Dear all,

we checked the geometry (supersposition of a number of subdetectors) using the following macro

```
macro/run/sim_complete.C
```

without event generation (the following lines were commented out:

```
//fRun->Run(nEvents);
```

```
//exit(0);
```

```
)
```

And we got a number of overlaps (see below).

Does this macro suppose to have these overlaps?

What do the overlaps mean in terms of the resulting data sample? Do they spoil the simulated data?

What is the right macro to run simulation with at least STT, EMC, SciTil and DIRC detectors put together?

Best regards,  
Maria Patsyuk

```
root [1] gGeoManager->CheckGeometryFull()
```

```
=====
STAGE 1: Overlap checking by sampling within 10 microns
=====
```

```
Info in <TGeoNodeMatrix::CheckOverlaps>: Checking overlaps for cave and daughters within 0.001
```

```
Info in <TGeoNodeMatrix::CheckOverlaps>: Checking overlaps by sampling <s> for cave and daughters
```

```
Info in <TGeoNodeMatrix::CheckOverlaps>: === NOTE: Extrusions NOT checked with sampling option ! ===
```

```
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 188.12 +/- 71.1025 [cm3] for daughters of FullSuperConductingSolenoidov831
```

```
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 13.4371 +/- 13.4371 [cm3] for daughters of Cryostatov830o2
```

```
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 14 overlaps adding-up to 268747 +/- 3761.36 [cm3] for daughters of ms
```

```
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 2 overlaps adding-up to 261.124 +/- 82.5745 [cm3] for daughters of BeamPipe
```

```
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 36 overlaps adding-up to 57.771 +/- 7.65195 [cm3] for daughters of stt01assembly
```

```
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 4 overlaps adding-up to 19.236 +/- 1.83408 [cm3] for daughters of Mvd-2.1o(Central-Mvd)
```

Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 166.789 +/- 5.21982 [cm3] for daughters of Mvd-2.1oSupport  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 10235 +/- 34.7595 [cm3] for daughters of Mvd-SupportoGlobalFwd  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 0.000116925 +/- 0.000116925 [cm3] for daughters of SupportoPbloConeo1olloaoii  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 0.00211537 +/- 0.00211537 [cm3] for daughters of Mvd-SupportoBI2  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 502.4 +/- 4.19747 [cm3] for daughters of Mvd-2.1oComponents  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 816.014 +/- 4.80008 [cm3] for daughters of Mvd-ComponentsoConoElectronics  
...

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Subject: Re: geometry overlaps for PANDA subdetectors  
Posted by [Stefano Spataro](#) on Thu, 18 Jul 2013 13:13:58 GMT  
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Hi Maria,  
the macro is the correct one, which include ALL the panda detectors.

Some of the overlaps are know and not important, i.e. the ones in the solenoid; some others are negligible and will be fixed not in a short time, i.e. stt once there will be the full geometry including all the passive elements.

Others are known but not studied yet, i.e. the fsc one.

Others are new for me, i.e. the mvd ones. I will take a look.

Could you please copy the full log of the overlaps?

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Subject: Re: geometry overlaps for PANDA subdetectors  
Posted by [Maria Patsyuk](#) on Thu, 18 Jul 2013 13:43:21 GMT  
[View Forum Message](#) <> [Reply to Message](#)

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Hi Stefano,

the full list of overlaps I can post tomorrow as the "CheckGeometryFull"-process takes hours. Is it ok?

Best regards,  
Maria

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Subject: Re: geometry overlaps for PANDA subdetectors

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This is the list I obtain:

```
root [2] gGeoManager->PrintOverlaps()
=== Overlaps for FAIRGeom ===
= Overlap ov00000: rich01gas extruded by: rich01gas/rich01mirror_0 ovlp=0.1084
= Overlap ov00001: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_14 ovlp=2.36489
= Overlap ov00002: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_15 ovlp=2.36489
= Overlap ov00003: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_20 ovlp=2.36226
= Overlap ov00004: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_21 ovlp=2.30958
= Overlap ov00005: ms/md05_2 overlapping ms/md07_1 ovlp=1.86286
= Overlap ov00006: ms/md05_3 overlapping ms/md07_2 ovlp=1.86286
= Overlap ov00007: ms/md05_1 overlapping ms/md07_1 ovlp=1.86286
= Overlap ov00008: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_9 ovlp=1.47
= Overlap ov00009: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_8 ovlp=1.47
= Overlap ov00010: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_13 ovlp=1.46991
= Overlap ov00011: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_19 ovlp=1.46991
= Overlap ov00012: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_26 ovlp=1.46964
= Overlap ov00013: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_27 ovlp=1.46964
= Overlap ov00014: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_16 ovlp=1.46919
= Overlap ov00015: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_22 ovlp=1.46919
= Overlap ov00016: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_7 ovlp=1.44823
= Overlap ov00017: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_10 ovlp=1.44823
= Overlap ov00018: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_25 ovlp=1.4456
= Overlap ov00019: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_28 ovlp=1.39292
= Overlap ov00020:
cave/FullSuperconductingSolenoidov831_0/SuperconductingSolenoidov831_1/Cryostatov830
o2_1/Supporto4oPartAss_1/Supporto4_1 overlapping
cave/Mdt_1/MdtBarrel_1/MdtBarrelLayer00_1/MDT1s1l0b0w0_1 ovlp=0.846021
= Overlap ov00021:
cave/FullSuperconductingSolenoidov831_0/SuperconductingSolenoidov831_2/Cryostatov830
o2_2/Supporto4oPartAss_2/Supporto4_2 overlapping
cave/Mdt_1/MdtBarrel_1/MdtBarrelLayer00_1/MDT1s5l0b0w0_5 ovlp=0.846021
```

= Overlap ov00022:  
cave/FullSuperConductingSolenoidov831\_0/SuperconductingSolenoidov831\_2/Cryostatov830  
o2\_2/Supporto2oPartAss\_2/Supporto2\_2 overlapping  
cave/Mdt\_1/MdtBarrel\_1/MdtBarrelLayer00\_1/MDT1s5l0b0w0\_5 ovlp=0.84602

= Overlap ov00023:  
cave/FullSuperConductingSolenoidov831\_0/SuperconductingSolenoidov831\_1/Cryostatov830  
o2\_1/Supporto2oPartAss\_1/Supporto2\_1 overlapping  
cave/Mdt\_1/MdtBarrel\_1/MdtBarrelLayer00\_1/MDT1s1l0b0w0\_1 ovlp=0.84602

= Overlap ov00024:  
cave/FullSuperConductingSolenoidov831\_0/SuperconductingSolenoidov831\_1/Cryostatov830  
o2\_1/Supporto2oPartAss\_1/Supporto2\_1 overlapping  
cave/Mdt\_1/MdtBarrel\_1/MdtBarrelLayer00\_1/MDT1s0l0b0w0\_0 ovlp=0.751859

= Overlap ov00025:  
cave/FullSuperConductingSolenoidov831\_0/SuperconductingSolenoidov831\_2/Cryostatov830  
o2\_2/Supporto2oPartAss\_2/Supporto2\_2 overlapping  
cave/Mdt\_1/MdtBarrel\_1/MdtBarrelLayer00\_1/MDT1s4l0b0w0\_4 ovlp=0.600122

= Overlap ov00026:  
cave/FullSuperConductingSolenoidov831\_0/SuperconductingSolenoidov831\_2/Cryostatov830  
o2\_2/Supporto6oPartAss\_2/Supporto6\_2 overlapping  
cave/Mdt\_1/MdtBarrel\_1/MdtBarrelLayer00\_1/MDT1s6l0b0w0\_6 ovlp=0.600122

= Overlap ov00027:  
cave/FullSuperConductingSolenoidov831\_0/SuperconductingSolenoidov831\_1/Cryostatov830  
o2\_1/Supporto6oPartAss\_1/Supporto6\_1 overlapping  
cave/Mdt\_1/MdtBarrel\_1/MdtBarrelLayer00\_1/MDT1s2l0b0w0\_2 ovlp=0.600122

= Overlap ov00028:  
cave/FullSuperConductingSolenoidov831\_0/SuperconductingSolenoidov831\_2/Cryostatov830  
o2\_2/Supporto6oPartAss\_2/Supporto6\_2 overlapping  
cave/Mdt\_1/MdtBarrel\_1/MdtBarrelLayer00\_1/MDT1s3l0b0w0\_3 ovlp=0.600121

= Overlap ov00029:  
cave/FullSuperConductingSolenoidov831\_0/SuperconductingSolenoidov831\_1/Cryostatov830  
o2\_1/Supporto6oPartAss\_1/Supporto6\_1 overlapping  
cave/Mdt\_1/MdtBarrel\_1/MdtBarrelLayer00\_1/MDT1s7l0b0w0\_7 ovlp=0.600121

= Overlap ov00030:  
cave/FullSuperConductingSolenoidov831\_0/SuperconductingSolenoidov831\_1/Cryostatov830  
o2\_1/Supporto4oPartAss\_1/Supporto4\_1 overlapping  
cave/Mdt\_1/MdtBarrel\_1/MdtBarrelLayer00\_1/MDT1s2l0b0w0\_2 ovlp=0.600121

= Overlap ov00031:  
cave/FullSuperConductingSolenoidov831\_0/SuperconductingSolenoidov831\_2/Cryostatov830  
o2\_2/Supporto4oPartAss\_2/Supporto4\_2 overlapping  
cave/Mdt\_1/MdtBarrel\_1/MdtBarrelLayer00\_1/MDT1s6l0b0w0\_6 ovlp=0.600121

= Overlap ov00032: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_2 ovlp=0.553333

= Overlap ov00033: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_4 ovlp=0.553333

= Overlap ov00034: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_3 ovlp=0.553333

= Overlap ov00035: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_1 ovlp=0.553333

= Overlap ov00036: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_18 ovlp=0.553243

= Overlap ov00037: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_12 ovlp=0.553243

= Overlap ov00038: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_6 ovlp=0.553243

= Overlap ov00039: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_24 ovlp=0.553243

= Overlap ov00040: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_34 ovlp=0.552974

= Overlap ov00041: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_31 ovlp=0.552974

= Overlap ov00042: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_32 ovlp=0.552974

= Overlap ov00043: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_33 ovlp=0.552974

= Overlap ov00044: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_23 ovlp=0.552526

= Overlap ov00045: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_17 ovlp=0.552526

= Overlap ov00046: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_29 ovlp=0.552526

= Overlap ov00047: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_11 ovlp=0.552526

= Overlap ov00048: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_0 ovlp=0.531561

= Overlap ov00049: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_5 ovlp=0.531561

= Overlap ov00050: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_30 ovlp=0.528929

= Overlap ov00051: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_35 ovlp=0.476252

= Overlap ov00052: stt01assembly/stt01tube\_1873 overlapping  
stt01assembly/stt01tube1924\_0 ovlp=0.273734

= Overlap ov00053: stt01assembly/stt01tube\_2099 overlapping  
stt01assembly/stt01tube2151\_0 ovlp=0.27352

= Overlap ov00054: stt01assembly/stt01tube\_1985 overlapping  
stt01assembly/stt01tube2036\_0 ovlp=0.266989

= Overlap ov00055: stt01assembly/stt01tube\_2214 overlapping  
stt01assembly/stt01tube2266\_0 ovlp=0.266984

= Overlap ov00056:  
Mvd-2.1oSupport/Mvd-SupportoGlobalFrame\_1/GsupoFrameoCylinderoXsoPartAss\_1/Gsupo  
FrameoCylinderoXs\_1 overlapping

Mvd-2.1oSupport/Mvd-SupportoSfwd\_1/StripoFwdoSupportoRingoPartAss\_2/StripoFwdoSupp  
ortoRing\_1 ovlp=0.2

= Overlap ov00057: cave/BeamPipe\_0/DipolePip\_0 overlapping  
cave/Ftof\_strips\_0/Ftof\_Central\_Strip14\_14 ovlp=0.146051

= Overlap ov00058: cave/BeamPipe\_0/DipolePip\_0 overlapping  
cave/Ftof\_strips\_0/Ftof\_Central\_Strip13\_13 ovlp=0.146051

= Overlap ov00059: cave/BeamPipe\_0/DipolePip\_0 overlapping  
cave/Ftof\_strips\_0/Ftof\_Beam\_Strip10\_10 ovlp=0.109065

= Overlap ov00060: cave/BeamPipe\_0/DipolePip\_0 overlapping  
cave/Ftof\_strips\_0/Ftof\_Beam\_Strip11\_11 ovlp=0.109065

= Overlap ov00061: cave/BeamPipe\_0/DipolePip\_0 overlapping  
cave/Ftof\_strips\_0/Ftof\_Beam\_Strip09\_9 ovlp=0.109065

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Subject: Re: geometry overlaps for PANDA subdetectors  
Posted by [Maria Patsyuk](#) on Fri, 19 Jul 2013 11:28:16 GMT  
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That's the list of overlaps we got:

That's the list of overlaps we got:

l()  
=====

STAGE 1: Overlap checking by sampling within 10 microns  
=====

Info in <TGeoNodeMatrix::CheckOverlaps>: Checking overlaps for cave and daughters within 0.001  
Info in <TGeoNodeMatrix::CheckOverlaps>: Checking overlaps by sampling <s> for cave and daughters  
Info in <TGeoNodeMatrix::CheckOverlaps>: === NOTE: Extrusions NOT checked with sampling option ! ===  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 295.617 +/- 89.1317 [cm3] for daughters of FullSuperConductingSolenoidov831  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 94.0598 +/- 35.5513 [cm3] for daughters of Cryostatov830o2  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 14 overlaps adding-up to 265062 +/- 3735.49 [cm3] for daughters of ms  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 2 overlaps adding-up to 391.685 +/- 101.133 [cm3] for daughters of BeamPipe  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 39 overlaps adding-up to 57.771 +/- 7.65195 [cm3] for daughters of tt01assembly  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 4 overlaps adding-up to 20.1104 +/- 1.8753 [cm3] for daughters of Mvd-2.1o(Central-Mvd)  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 159.438 +/- 5.10349 [cm3] for daughters of Mvd-2.1oSupport  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 10229.6 +/- 34.7505 [cm3] for daughters of Mvd-SupportoGlobalFwd  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 0.000251923 +/- 0.000251923 [cm3] for daughters of Mvd-SupportoBI1  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 0.00211537 +/- 0.00211537 [cm3] for daughters of Mvd-SupportoBI2  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 495.246 +/- 4.16748 [cm3] for daughters of Mvd-2.1oComponents  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 817.03 +/- 4.80307 [cm3] for daughters ofMvd-ComponentsoConoElectronics  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 501.66 +/- 3.61028 [cm3] for daughters of Mvd-ComponentsoMctrl  
Error in <TGeoChecker::CheckOverlapsBySampling>: No point inside volume!!! - aborting  
Error in <TGeoChecker::CheckOverlapsBySampling>: No point inside volume!!! - aborting  
Error in <TGeoChecker::CheckOverlapsBySampling>: No point inside volume!!! - aborting  
Error in <TGeoChecker::CheckOverlapsBySampling>: No point inside volume!!! - aborting  
Error in <TGeoChecker::CheckOverlapsBySampling>: No point inside volume!!! - aborting  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 8.74501 +/- 1.06837 [cm3] for daughters of Mvd-2.1oRouting

Error in <TGeoChecker::CheckOverlapsBySampling>: No point inside volume!!! - aborting  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to  
0.0364258 +/- 0.0364258 [cm3] for daughters of  
Mvd-RoutingoBl1oInsulation-Hv  
Error in <TGeoChecker::CheckOverlapsBySampling>: No point inside volume!!! - aborting  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to  
0.046539 +/- 0.046539 [cm3] for daughters of Mvd-RoutingoBl2  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to  
5.29099e-05 +/- 5.29099e-05 [cm3] for daughters of  
CableoInsulation-Feo3oIloBundle  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 2 overlaps adding-up to  
4.7643e-05 +/- 3.36887e-05 [cm3] for daughters of  
CoolingoInsulationo3oIloBundle  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to  
0.0842489 +/- 0.0842489 [cm3] for daughters of Mvd-RoutingoBl4  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 1 overlaps adding-up to 276.38  
+/- 5.72201 [cm3] for daughters of Mvd-RoutingoPfd  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 16 overlaps adding-up to  
30.5158 +/- 5.31211 [cm3] for daughters of Emc3  
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 36 overlaps adding-up to  
37.3468 +/- 0.281273 [cm3] for daughters of FscModuleVolume  
Check overlaps: [=====] 2008078 [100.00 %] TIME 16:58:26  
Info in <TGeoNodeMatrix::CheckOverlaps>: Number of illegal  
overlaps/extrusions : 128

=====  
STAGE 2: Global overlap/extrusion checking within 10 microns  
=====  
Info in <TGeoNodeMatrix::CheckOverlaps>: Checking overlaps for cave and daughters within  
0.001  
Warning in <TGeoChecker::CheckOverlaps>: Volume SuperconductingSolenoidov831 with 3  
daughters but not voxelized  
Warning in <TGeoChecker::CheckOverlaps>: Volume Cryostatov830o2 with 12 daughters but  
not voxelized  
Warning in <TGeoChecker::CheckOverlaps>: Volume SuperconductingCoilov831 with 3  
daughters but not voxelized  
^C == 9% == [\ ] 42656 [ 2.12 %] TIME 04:26:26

Ours seem to be different from yours or?

Best regards,  
Maria

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Subject: Re: geometry overlaps for PANDA subdetectors  
Posted by [Stefano Spataro](#) on Tue, 23 Jul 2013 09:43:53 GMT  
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Yes I see the same, I will start to investigate.

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Subject: Re: geometry overlaps for PANDA subdetectors  
Posted by [Stefano Spataro](#) on Wed, 24 Jul 2013 13:54:36 GMT  
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After some studies, I write here the list of overlaps I found:

MVD: Many internal overlaps, hopefully negligible. The geometry should be revised (?)

STT: Minor overlaps between the ends of some straws, this will be fixed in the STT version with all the passive elements.

EMC3: Many internal overlaps, the geometry should be revised (?)

FSC: Many internal overlaps, the geometry should be revised (?)

SOLENOID: Minor internal overlaps, negligible. Also overlap of support structure with MDT layer 0, negligible.

DIPOLE: Minor internal overlaps, revised (?)

RICH: The mirror is larger than the container box. Minor.

Between the previous overlaps, I believe the MVD, EMC3 and FSC should be fixed to be on the safe side.

Moreover, there are other overlaps coming from the target+beam pipe:

PIPE: Internal overlaps in some valve and in the transition to dipole pipe.

FTOF: Overlaps in the hole region

EMC12: Overlaps in the hole region

STT: Overlaps between the two halves.

GEM: Overlaps in the hole region

I don't understand in particular the overlaps in the barrel spectrometer, the target pipe becomes larger than the space originally left and many detectors should be more separated... Quite strange. Not clear if the detector geometries should be modified or simply the pipe is too large. I know there is some more updated design of the pipe, I would wait for it before complaining officially.

I leave the word now to the detector experts...

Subject: Re: geometry overlaps for PANDA subdetectors  
Posted by [Prometeusz Jasinski](#) on Mon, 29 Jul 2013 09:26:45 GMT  
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Hi, concerning the beam pipe:

I attached an updated version, but the beam pipe is even larger. I find internal overlaps even more interesting. How do I check those?

I wanted to wait for some decisions to be taken from the CAD integration side, like what happens to the pumps upstream of the dipole, but I'm afraid that we should insert simply the current beam pipe description. I see that many people realize that their detectors do not fit only from the detector description in pandaroot. Decisions about beam pipe enlargement are already approved by the technical board.

### File Attachments

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1) [beampipe\\_201303.root](#), downloaded 456 times

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Subject: Re: geometry overlaps for PANDA subdetectors  
Posted by [StefanoSpataro](#) on Tue, 30 Jul 2013 07:54:14 GMT  
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Prometeusz Jasinski wrote on Mon, 29 July 2013 11:26Hi, concerning the beam pipe:

I attached an updated version, but the beam pipe is even larger. I find internal overlaps even more interesting. How do I check those?

I answer to your first question.

Run the simulation with few events. After, you open the simparams.root file, click on FairBaseParSet, and it will load the gGeoManager. From this you can:

```
gGeoManager->CheckGeometryFull();
```

or with the mouse you click in the FAIRGeom folder and run the same command. After you check overlaps, you can draw them from the "Overlaps" folder, or also print them  
->PrintOverlaps(),

I do not suggest to include MVD geometry, since it takes almost 1 day to do the full check. The rest of PANDA is much much faster.

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Subject: Re: geometry overlaps for PANDA subdetectors  
Posted by [StefanoSpataro](#) on Thu, 01 Aug 2013 07:14:50 GMT  
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Hi,

I committed the geometry in svn, and launched the check of overlaps for ONLY the new beam pipe.

This is what I obtained:

```
=====
STAGE 1: Overlap checking by sampling within 10 microns
=====
Info in <TGeoNodeMatrix::CheckOverlaps>: Checking overlaps for cave and daughters within
0.001
Info in <TGeoNodeMatrix::CheckOverlaps>: Checking overlaps by sampling <s> for cave and
daughters
Info in <TGeoNodeMatrix::CheckOverlaps>: === NOTE: Extrusions NOT checked with
sampling option ! ===
Info in <TGeoChecker::CheckOverlapsBySampling>: #Found 2 overlaps adding-up to 3049.03
+/- 280.686 [cm3] for daughters of BeamPipe
Check overlaps: [=====] 11 [100.00 %] TIME 00:00:54
Info in <TGeoNodeMatrix::CheckOverlaps>: Number of illegal overlaps/extrusions : 2

=====
STAGE 2: Global overlap/extrusion checking within 10 microns
=====
Info in <TGeoNodeMatrix::CheckOverlaps>: Checking overlaps for cave and daughters within
0.001
Check overlaps: [=====] 11 [100.00 %] TIME 00:00:00
Info in <TGeoNodeMatrix::CheckOverlaps>: Number of illegal overlaps/extrusions : 2

=====
STAGE 3: Propagating 1000000 tracks starting from vertex
and counting number of boundary crossings...
=====
Transporting tracks [=====] 1000000 [100.00 %] TIME 00:00:06
Time for crossing 2050289 boundaries: 6.08e+06 [ms]
Time per track for full geometry traversal: 6.08 [ms], per crossing: 2.96544 [ms]
=====
STAGE 4: How much navigation time per volume per next+safety call
=====
Time for volume cave (assemb=0): 0.67 [ms] ndaughters=1 ncross=1024810
Time for volume BeamPipe (assemb=1): 0.82 [ms] ndaughters=9 ncross=1025479
Time for volume gvhesr (shape=VATvalve100): 0.43 [ms] ndaughters=0 ncross=239
Time for volume pipeup (shape=pipeup): 0.24 [ms] ndaughters=0 ncross=291
Time for volume ktmpump (shape=ktmpump): 0.6 [ms] ndaughters=0 ncross=983
Time for volume Tpump (shape=Tpumps): 1.46 [ms] ndaughters=0 ncross=2605
Time for volume pipeTSup (shape=pipeTSup): 0.25 [ms] ndaughters=0 ncross=16487
Time for volume Tcross (shape=Tcross): 1.62 [ms] ndaughters=0 ncross=997875
Time for volume pipeTSdown (shape=pipeTSdown): 0.25 [ms] ndaughters=0 ncross=2619
Time for volume crossTSTMPs (shape=crossTSTMPs): 2.57 [ms] ndaughters=0 ncross=4060
Time for volume DipolePip (shape=Dippip): 1.98 [ms] ndaughters=0 ncross=320
STAGE 4 completed [=====/] 11 [ 91.67 %]
root [9] gGeoManager.PrintOverlaps()
=== Overlaps for FAIRGeom ===
= Overlap ov00000: BeamPipe/gvhesr_0 overlapping BeamPipe/pipeup_0 ovlp=0.0825
= Overlap ov00001: BeamPipe/crossTSTMPs_0 overlapping BeamPipe/DipolePip_0
ovlp=0.005
root [10]
```

Two internal overlaps are present, maybe some fixes are needed.

---

---

Subject: Re: geometry overlaps for PANDA subdetectors  
Posted by [Prometeusz Jasinski](#) on Thu, 01 Aug 2013 08:07:23 GMT  
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I will try to resolve it.

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Subject: Re: geometry overlaps for PANDA subdetectors  
Posted by [Prometeusz Jasinski](#) on Thu, 01 Aug 2013 10:11:17 GMT  
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Ok, this geometry (without parts of the valves upstream of the dipole, since it was decided during beam pipe session we will try to omit those) should be ok.

There are some blank spaces. As soon as I know more mechanical details on the pipe, I can include it.

If it is ok, could you please commit this version?

Cheers Promme

PS: Here is the output of the checks

Info in <TGeoNodeMatrix::CheckOverlaps>: Checking overlaps for pipeassembly and daughters within 0.001

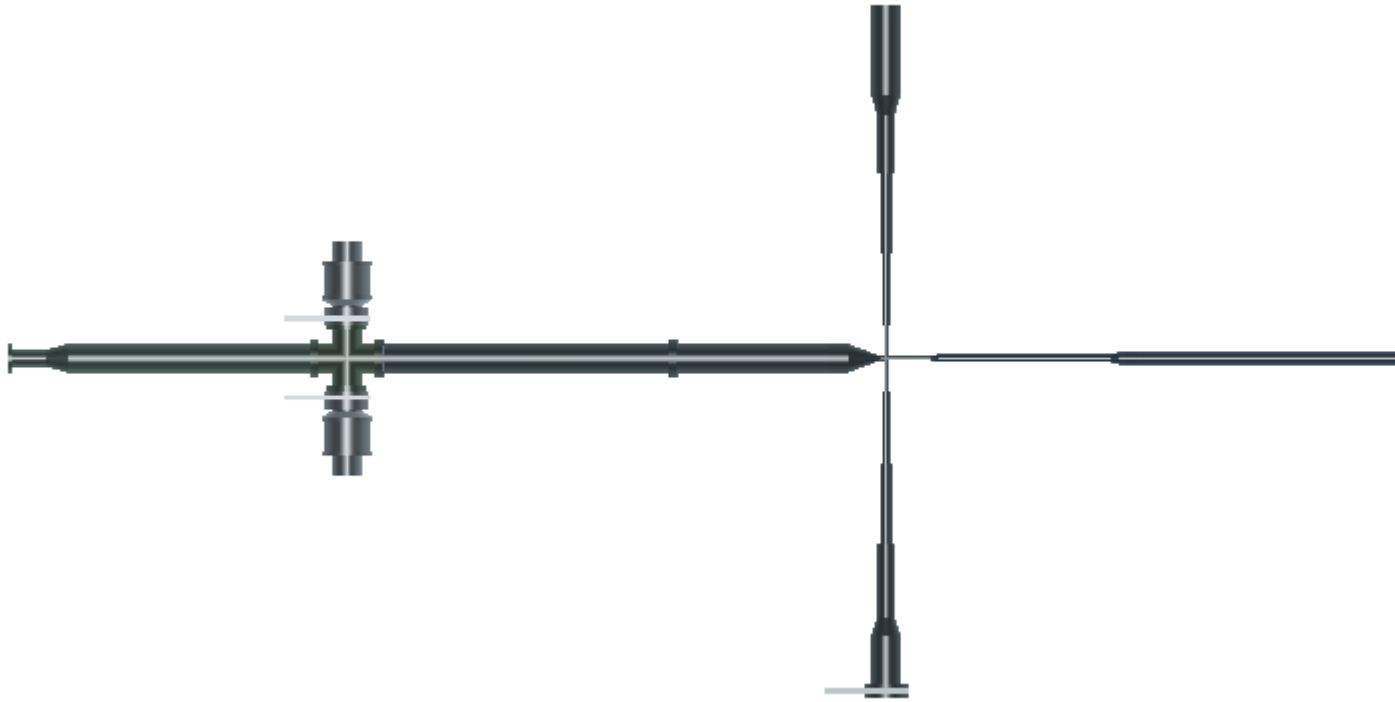
Check overlaps: [=====] 10 [100.00 %] TIME 00:00:00

Info in <TGeoNodeMatrix::CheckOverlaps>: Number of illegal overlaps/extrusions : 0

### File Attachments

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- 1) [beampipe\\_201308.root](#), downloaded 372 times
- 2) [viewer.png](#), downloaded 903 times



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Subject: Re: geometry overlaps for PANDA subdetectors  
Posted by [Stefano Spataro](#) on Thu, 01 Aug 2013 13:44:24 GMT  
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I have committed the last geometry and deleted the previous one. Now I can see no internal pipe overlaps, but I can see the overlaps with the other detectors. This is another issue... I update the default macros, to use such geometry (macro/run/sim\_complete.C).

As a trace, I copy here the list of overlaps I have w/ all the detectors BUT w/o MVD (MVD takes too long).

```
root [3] gGeoManager.PrintOverlaps()
=== Overlaps for FAIRGeom ===
= Overlap ov00000: rich01gas extruded by: rich01gas/rich01mirror_0 ovlp=0.1084
= Overlap ov00001: FscModuleVolume extruded by: FscModuleVolume/FscFibHoleVolume_0
ovlp=0.025
= Overlap ov00002: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_14 ovlp=2.36489
= Overlap ov00003: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_15 ovlp=2.36489
= Overlap ov00004: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_20 ovlp=2.36226
= Overlap ov00005: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_21 ovlp=2.30958
= Overlap ov00006: FscModuleVolume/FscTyvekVolume_0 overlapping
FscModuleVolume/FscFibHoleVolume_8 ovlp=1.47
```

= Overlap ov00007: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_9 ovlp=1.47  
= Overlap ov00008: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_19 ovlp=1.46991  
= Overlap ov00009: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_13 ovlp=1.46991  
= Overlap ov00010: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_26 ovlp=1.46964  
= Overlap ov00011: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_27 ovlp=1.46964  
= Overlap ov00012: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_16 ovlp=1.46919  
= Overlap ov00013: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_22 ovlp=1.46919  
= Overlap ov00014: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_7 ovlp=1.44823  
= Overlap ov00015: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_10 ovlp=1.44823  
= Overlap ov00016: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_25 ovlp=1.4456  
= Overlap ov00017: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_28 ovlp=1.39292  
= Overlap ov00018: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_2 ovlp=0.553333  
= Overlap ov00019: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_1 ovlp=0.553333  
= Overlap ov00020: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_3 ovlp=0.553333  
= Overlap ov00021: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_4 ovlp=0.553333  
= Overlap ov00022: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_6 ovlp=0.553243  
= Overlap ov00023: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_12 ovlp=0.553243  
= Overlap ov00024: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_18 ovlp=0.553243  
= Overlap ov00025: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_24 ovlp=0.553243  
= Overlap ov00026: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_33 ovlp=0.552974  
= Overlap ov00027: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_34 ovlp=0.552974  
= Overlap ov00028: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_31 ovlp=0.552974  
= Overlap ov00029: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_32 ovlp=0.552974  
= Overlap ov00030: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_29 ovlp=0.552526  
= Overlap ov00031: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_11 ovlp=0.552526  
= Overlap ov00032: FscModuleVolume/FscTyvekVolume\_0 overlapping FscModuleVolume/FscFibHoleVolume\_23 ovlp=0.552526

= Overlap ov00033: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_17 ovlp=0.552526  
= Overlap ov00034: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_0 ovlp=0.531561  
= Overlap ov00035: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_5 ovlp=0.531561  
= Overlap ov00036: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_30 ovlp=0.528929  
= Overlap ov00037: FscModuleVolume/FscTyvekVolume\_0 overlapping  
FscModuleVolume/FscFibHoleVolume\_35 ovlp=0.476252  
= Overlap ov00038: stt01assembly/stt01tube\_1873 overlapping  
stt01assembly/stt01tube1924\_0 ovlp=0.273734  
= Overlap ov00039: stt01assembly/stt01tube\_2099 overlapping  
stt01assembly/stt01tube2151\_0 ovlp=0.27352  
= Overlap ov00040: stt01assembly/stt01tube\_1985 overlapping  
stt01assembly/stt01tube2036\_0 ovlp=0.266989  
= Overlap ov00041: stt01assembly/stt01tube\_2214 overlapping  
stt01assembly/stt01tube2266\_0 ovlp=0.266984  
= Overlap ov00042: cave/BeamPipe\_0/DipolePip\_0 overlapping  
cave/fts03assembly\_1/fts37tube\_90 ovlp=0.249504  
= Overlap ov00043: cave/BeamPipe\_0/DipolePip\_0 overlapping  
cave/Ftof\_strips\_0/Ftof\_Beam\_Strip09\_9 ovlp=0.14715  
= Overlap ov00044: cave/BeamPipe\_0/DipolePip\_0 overlapping  
cave/Ftof\_strips\_0/Ftof\_Beam\_Strip11\_11 ovlp=0.14715  
= Overlap ov00045: cave/BeamPipe\_0/DipolePip\_0 overlapping  
cave/Ftof\_strips\_0/Ftof\_Beam\_Strip10\_10 ovlp=0.14715  
= Overlap ov00046: cave/BeamPipe\_0/DipolePip\_0 overlapping  
cave/Ftof\_strips\_0/Ftof\_Central\_Strip8\_8 ovlp=0.138157  
= Overlap ov00047: Emc3/SubunitVolFwEndCap\_434/BoxVol\_4 overlapping  
Emc3/HalfSubunitVolFwEndCap\_28/AlveoleVol\_halfsubunit\_0 ovlp=0.073979  
= Overlap ov00048: Emc3/SubunitVolFwEndCap\_134/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_39/AlveoleVol\_halfsubunit\_0 ovlp=0.073979  
= Overlap ov00049: Emc3/SubunitVolFwEndCap\_234/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_45/AlveoleVol\_halfsubunit\_0 ovlp=0.073979  
= Overlap ov00050: Emc3/SubunitVolFwEndCap\_240/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_46/AlveoleVol\_halfsubunit\_0 ovlp=0.0724145  
= Overlap ov00051: Emc3/SubunitVolFwEndCap\_440/BoxVol\_4 overlapping  
Emc3/HalfSubunitVolFwEndCap\_29/AlveoleVol\_halfsubunit\_0 ovlp=0.0724145  
= Overlap ov00052: Emc3/SubunitVolFwEndCap\_140/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_38/AlveoleVol\_halfsubunit\_0 ovlp=0.0724145  
= Overlap ov00053: Emc3/HalfSubunitVolFwEndCap\_5/BoxVol\_2 overlapping  
Emc3/HalfSubunitVolFwEndCap\_25/AlveoleVol\_halfsubunit\_0 ovlp=0.072254  
= Overlap ov00054: Emc3/HalfSubunitVolFwEndCap\_10/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_42/AlveoleVol\_halfsubunit\_0 ovlp=0.072254  
= Overlap ov00055: Emc3/SubunitVolFwEndCap\_405/BoxVol\_4 overlapping  
Emc3/HalfSubunitVolFwEndCap\_26/AlveoleVol\_halfsubunit\_0 ovlp=0.0702632  
= Overlap ov00056: Emc3/SubunitVolFwEndCap\_205/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_43/AlveoleVol\_halfsubunit\_0 ovlp=0.0702632  
= Overlap ov00057: Emc3/SubunitVolFwEndCap\_105/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_41/AlveoleVol\_halfsubunit\_0 ovlp=0.0702632  
= Overlap ov00058: Emc3/SubunitVolFwEndCap\_305/BoxVol\_2 overlapping  
Emc3/HalfSubunitVolFwEndCap\_58/AlveoleVol\_halfsubunit\_0 ovlp=0.0702264

= Overlap ov00059: Emc3/SubunitVolFwEndCap\_111/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_40/AlveoleVol\_halfsubunit\_0 ovlp=0.0695844  
= Overlap ov00060: Emc3/SubunitVolFwEndCap\_411/BoxVol\_4 overlapping  
Emc3/HalfSubunitVolFwEndCap\_27/AlveoleVol\_halfsubunit\_0 ovlp=0.0695844  
= Overlap ov00061: Emc3/SubunitVolFwEndCap\_211/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_44/AlveoleVol\_halfsubunit\_0 ovlp=0.0695844  
= Overlap ov00062: Emc3/SubunitVolFwEndCap\_311/BoxVol\_2 overlapping  
Emc3/HalfSubunitVolFwEndCap\_57/AlveoleVol\_halfsubunit\_0 ovlp=0.0695084  
= Overlap ov00063: Emc3/SubunitVolFwEndCap\_105/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_42/AlveoleVol\_halfsubunit\_0 ovlp=0.0677316  
= Overlap ov00064: Emc3/SubunitVolFwEndCap\_405/BoxVol\_2 overlapping  
Emc3/HalfSubunitVolFwEndCap\_25/AlveoleVol\_halfsubunit\_0 ovlp=0.0677316  
= Overlap ov00065: Emc3/SubunitVolFwEndCap\_205/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_42/AlveoleVol\_halfsubunit\_0 ovlp=0.0677316  
= Overlap ov00066: Emc3/SubunitVolFwEndCap\_305/BoxVol\_4 overlapping  
Emc3/HalfSubunitVolFwEndCap\_58/AlveoleVol\_halfsubunit\_0 ovlp=0.0654664  
= Overlap ov00067: Emc3/SubunitVolFwEndCap\_205/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_43/AlveoleVol\_halfsubunit\_0 ovlp=0.0654664  
= Overlap ov00068: Emc3/SubunitVolFwEndCap\_105/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_41/AlveoleVol\_halfsubunit\_0 ovlp=0.0654664  
= Overlap ov00069: Emc3/SubunitVolFwEndCap\_333/BoxVol\_2 overlapping  
Emc3/HalfSubunitVolFwEndCap\_55/AlveoleVol\_halfsubunit\_0 ovlp=0.0638692  
= Overlap ov00070: Emc3/SubunitVolFwEndCap\_233/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_46/AlveoleVol\_halfsubunit\_0 ovlp=0.0638692  
= Overlap ov00071: Emc3/SubunitVolFwEndCap\_133/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_38/AlveoleVol\_halfsubunit\_0 ovlp=0.0638692  
= Overlap ov00072: Emc3/SubunitVolFwEndCap\_411/BoxVol\_2 overlapping  
Emc3/HalfSubunitVolFwEndCap\_26/AlveoleVol\_halfsubunit\_0 ovlp=0.0605936  
= Overlap ov00073: Emc3/SubunitVolFwEndCap\_211/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_43/AlveoleVol\_halfsubunit\_0 ovlp=0.0605936  
= Overlap ov00074: Emc3/SubunitVolFwEndCap\_111/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_41/AlveoleVol\_halfsubunit\_0 ovlp=0.0605936  
= Overlap ov00075: Emc3/SubunitVolFwEndCap\_211/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_44/AlveoleVol\_halfsubunit\_0 ovlp=0.0593387  
= Overlap ov00076: Emc3/SubunitVolFwEndCap\_111/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_40/AlveoleVol\_halfsubunit\_0 ovlp=0.0593387  
= Overlap ov00077: Emc3/SubunitVolFwEndCap\_311/BoxVol\_4 overlapping  
Emc3/HalfSubunitVolFwEndCap\_57/AlveoleVol\_halfsubunit\_0 ovlp=0.0593387  
= Overlap ov00078: Emc3/SubunitVolFwEndCap\_219/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_44/AlveoleVol\_halfsubunit\_0 ovlp=0.0549224  
= Overlap ov00079: Emc3/SubunitVolFwEndCap\_419/BoxVol\_2 overlapping  
Emc3/HalfSubunitVolFwEndCap\_27/AlveoleVol\_halfsubunit\_0 ovlp=0.0549224  
= Overlap ov00080: Emc3/SubunitVolFwEndCap\_119/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_40/AlveoleVol\_halfsubunit\_0 ovlp=0.0549224  
= Overlap ov00081: Emc3/SubunitVolFwEndCap\_111/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_40/BoxVol\_1 ovlp=0.0509067  
= Overlap ov00082: Emc3/SubunitVolFwEndCap\_411/BoxVol\_4 overlapping  
Emc3/HalfSubunitVolFwEndCap\_27/BoxVol\_1 ovlp=0.0509067  
= Overlap ov00083: Emc3/SubunitVolFwEndCap\_134/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_39/BoxVol\_1 ovlp=0.0501728  
= Overlap ov00084: Emc3/SubunitVolFwEndCap\_434/BoxVol\_4 overlapping  
Emc3/HalfSubunitVolFwEndCap\_28/BoxVol\_1 ovlp=0.0501728

= Overlap ov00085: Emc3/SubunitVolFwEndCap\_234/BoxVol\_3 overlapping Emc3/HalfSubunitVolFwEndCap\_45/BoxVol\_2 ovlp=0.0501728  
= Overlap ov00086: cave/BeamPipe\_0/Tcross\_0 overlapping cave/Emc12Hole\_9/EmcLayer2Hole\_0/emc02r4c5\_0 ovlp=0.049205  
= Overlap ov00087: cave/BeamPipe\_0/Tcross\_0 overlapping cave/Emc12Hole\_1/EmcLayer2Hole\_0/emc02r4c5\_0 ovlp=0.049205  
= Overlap ov00088: cave/BeamPipe\_0/Tcross\_0 overlapping cave/Emc12Hole\_9/EmcLayer2Hole\_0/emc02r1c7\_0 ovlp=0.0491724  
= Overlap ov00089: cave/BeamPipe\_0/Tcross\_0 overlapping cave/Emc12Hole\_1/EmcLayer2Hole\_0/emc02r1c7\_0 ovlp=0.0491724  
= Overlap ov00090: Emc3/SubunitVolFwEndCap\_134/BoxVol\_3 overlapping Emc3/HalfSubunitVolFwEndCap\_39/AlveoleVol\_halfsubunit\_0 ovlp=0.0487848  
= Overlap ov00091: Emc3/SubunitVolFwEndCap\_234/BoxVol\_1 overlapping Emc3/HalfSubunitVolFwEndCap\_45/AlveoleVol\_halfsubunit\_0 ovlp=0.0487848  
= Overlap ov00092: Emc3/SubunitVolFwEndCap\_434/BoxVol\_2 overlapping Emc3/HalfSubunitVolFwEndCap\_28/AlveoleVol\_halfsubunit\_0 ovlp=0.0487848  
= Overlap ov00093: Emc3/SubunitVolFwEndCap\_105/BoxVol\_1 overlapping Emc3/HalfSubunitVolFwEndCap\_41/BoxVol\_1 ovlp=0.0487751  
= Overlap ov00094: Emc3/SubunitVolFwEndCap\_334/BoxVol\_4 overlapping Emc3/HalfSubunitVolFwEndCap\_56/AlveoleVol\_halfsubunit\_0 ovlp=0.0486073  
= Overlap ov00095: Emc3/SubunitVolFwEndCap\_240/BoxVol\_3 overlapping Emc3/HalfSubunitVolFwEndCap\_46/BoxVol\_2 ovlp=0.0485797  
= Overlap ov00096: Emc3/SubunitVolFwEndCap\_140/BoxVol\_1 overlapping Emc3/HalfSubunitVolFwEndCap\_38/BoxVol\_1 ovlp=0.0485797  
= Overlap ov00097: Emc3/SubunitVolFwEndCap\_440/BoxVol\_4 overlapping Emc3/HalfSubunitVolFwEndCap\_29/BoxVol\_1 ovlp=0.0485797  
= Overlap ov00098: Emc3/HalfSubunitVolFwEndCap\_10/BoxVol\_1 overlapping Emc3/HalfSubunitVolFwEndCap\_42/BoxVol\_1 ovlp=0.04824  
= Overlap ov00099: Emc3/HalfSubunitVolFwEndCap\_5/BoxVol\_2 overlapping Emc3/HalfSubunitVolFwEndCap\_25/BoxVol\_2 ovlp=0.0479261  
= Overlap ov00100: Emc3/HalfSubunitVolFwEndCap\_10/BoxVol\_1 overlapping Emc3/HalfSubunitVolFwEndCap\_42/BoxVol\_2 ovlp=0.0479261  
= Overlap ov00101: cave/BeamPipe\_0/Tcross\_0 overlapping cave/stt01assembly\_0/stt01box\_2 ovlp=0.047887  
= Overlap ov00102: cave/BeamPipe\_0/Tcross\_0 overlapping cave/stt01assembly\_0/stt01box\_3 ovlp=0.047887  
= Overlap ov00103: cave/BeamPipe\_0/Tcross\_0 overlapping cave/Emc12Hole\_1/EmcLayer2Hole\_0/emc02r2c7\_0 ovlp=0.0464446  
= Overlap ov00104: cave/BeamPipe\_0/Tcross\_0 overlapping cave/Emc12Hole\_9/EmcLayer2Hole\_0/emc02r2c7\_0 ovlp=0.0464446  
= Overlap ov00105: Emc3/SubunitVolFwEndCap\_305/BoxVol\_2 overlapping Emc3/HalfSubunitVolFwEndCap\_58/BoxVol\_2 ovlp=0.0459602  
= Overlap ov00106: Emc3/SubunitVolFwEndCap\_205/BoxVol\_3 overlapping Emc3/HalfSubunitVolFwEndCap\_43/BoxVol\_2 ovlp=0.0459602  
= Overlap ov00107: Emc3/SubunitVolFwEndCap\_105/BoxVol\_1 overlapping Emc3/HalfSubunitVolFwEndCap\_41/BoxVol\_2 ovlp=0.0458743  
= Overlap ov00108: Emc3/SubunitVolFwEndCap\_405/BoxVol\_4 overlapping Emc3/HalfSubunitVolFwEndCap\_26/BoxVol\_2 ovlp=0.0458743  
= Overlap ov00109: Emc3/SubunitVolFwEndCap\_205/BoxVol\_3 overlapping Emc3/HalfSubunitVolFwEndCap\_43/BoxVol\_1 ovlp=0.0458743  
= Overlap ov00110: stt01assembly/stt01outerCylinder\_1 overlapping stt01assembly/stt01box\_1 ovlp=0.0456831

= Overlap ov00111: Emc3/SubunitVolFwEndCap\_311/BoxVol\_2 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_57/BoxVol\_2 ovlp=0.0453087  
 = Overlap ov00112: Emc3/SubunitVolFwEndCap\_211/BoxVol\_3 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_44/BoxVol\_2 ovlp=0.0453087  
 = Overlap ov00113: Emc3/SubunitVolFwEndCap\_411/BoxVol\_4 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_27/BoxVol\_2 ovlp=0.0451314  
 = Overlap ov00114: Emc3/SubunitVolFwEndCap\_111/BoxVol\_1 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_40/BoxVol\_2 ovlp=0.0451314  
 = Overlap ov00115: Emc3/SubunitVolFwEndCap\_211/BoxVol\_3 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_44/BoxVol\_1 ovlp=0.0451314  
 = Overlap ov00116: cave/BeamPipe\_0/Tcross\_0 overlapping  
 cave/Emc12Hole\_1/EmcLayer2Hole\_0/emc02r3c7\_0 ovlp=0.0450102  
 = Overlap ov00117: cave/BeamPipe\_0/Tcross\_0 overlapping  
 cave/Emc12Hole\_9/EmcLayer2Hole\_0/emc02r3c7\_0 ovlp=0.0450102  
 = Overlap ov00118: Emc3/SubunitVolFwEndCap\_126/BoxVol\_1 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_39/AlveoleVol\_halfsubunit\_0 ovlp=0.0449412  
 = Overlap ov00119: Emc3/SubunitVolFwEndCap\_226/BoxVol\_3 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_45/AlveoleVol\_halfsubunit\_0 ovlp=0.0449412  
 = Overlap ov00120: Emc3/SubunitVolFwEndCap\_326/BoxVol\_2 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_56/AlveoleVol\_halfsubunit\_0 ovlp=0.0449412  
 = Overlap ov00121: cave/BeamPipe\_0/Tcross\_0 overlapping  
 cave/stt01assembly\_0/stt01box\_1 ovlp=0.0447398  
 = Overlap ov00122: Emc3/SubunitVolFwEndCap\_105/BoxVol\_3 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_42/BoxVol\_1 ovlp=0.0440472  
 = Overlap ov00123: Emc3/SubunitVolFwEndCap\_205/BoxVol\_1 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_42/BoxVol\_2 ovlp=0.0440472  
 = Overlap ov00124: Emc3/SubunitVolFwEndCap\_405/BoxVol\_2 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_25/BoxVol\_1 ovlp=0.0440472  
 = Overlap ov00125: Emc3/SubunitVolFwEndCap\_205/BoxVol\_1 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_43/BoxVol\_1 ovlp=0.0436612  
 = Overlap ov00126: Emc3/SubunitVolFwEndCap\_305/BoxVol\_4 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_58/BoxVol\_1 ovlp=0.0436612  
 = Overlap ov00127: Emc3/SubunitVolFwEndCap\_140/BoxVol\_3 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_38/AlveoleVol\_halfsubunit\_0 ovlp=0.0420361  
 = Overlap ov00128: Emc3/SubunitVolFwEndCap\_440/BoxVol\_2 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_29/AlveoleVol\_halfsubunit\_0 ovlp=0.0420361  
 = Overlap ov00129: Emc3/SubunitVolFwEndCap\_240/BoxVol\_1 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_46/AlveoleVol\_halfsubunit\_0 ovlp=0.0420361  
 = Overlap ov00130: Emc3/SubunitVolFwEndCap\_340/BoxVol\_4 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_55/AlveoleVol\_halfsubunit\_0 ovlp=0.0418211  
 = Overlap ov00131: Emc3/SubunitVolFwEndCap\_105/BoxVol\_3 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_41/BoxVol\_2 ovlp=0.0418111  
 = Overlap ov00132: Emc3/SubunitVolFwEndCap\_211/BoxVol\_1 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_44/BoxVol\_1 ovlp=0.0403207  
 = Overlap ov00133: Emc3/SubunitVolFwEndCap\_133/BoxVol\_1 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_38/BoxVol\_2 ovlp=0.0403166  
 = Overlap ov00134: Emc3/SubunitVolFwEndCap\_233/BoxVol\_3 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_46/BoxVol\_1 ovlp=0.0403166  
 = Overlap ov00135: Emc3/SubunitVolFwEndCap\_333/BoxVol\_2 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_55/BoxVol\_1 ovlp=0.0403166  
 = Overlap ov00136: Emc3/SubunitVolFwEndCap\_311/BoxVol\_4 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_57/BoxVol\_1 ovlp=0.0402109

= Overlap ov00137: cave/BeamPipe\_0/DipolePip\_0 overlapping  
cave/fts03assembly\_1/fts31tube\_295 ovlp=0.0390577

= Overlap ov00138: Emc3/SubunitVolFwEndCap\_211/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_43/BoxVol\_2 ovlp=0.0368826

= Overlap ov00139: Emc3/SubunitVolFwEndCap\_411/BoxVol\_2 overlapping  
Emc3/HalfSubunitVolFwEndCap\_26/BoxVol\_1 ovlp=0.0368826

= Overlap ov00140: Emc3/SubunitVolFwEndCap\_111/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_41/BoxVol\_1 ovlp=0.0368826

= Overlap ov00141: Emc3/SubunitVolFwEndCap\_111/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_40/BoxVol\_2 ovlp=0.0357086

= Overlap ov00142: stt01assembly/stt01tube\_2542 overlapping  
stt01assembly/stt01tube2570\_0 ovlp=0.0334194

= Overlap ov00143: stt01assembly/stt01tube\_2663 overlapping  
stt01assembly/stt01tube2691\_0 ovlp=0.0334194

= Overlap ov00144: stt01assembly/stt01tube\_2305 overlapping  
stt01assembly/stt01tube2332\_0 ovlp=0.0320374

= Overlap ov00145: stt01assembly/stt01tube\_2423 overlapping  
stt01assembly/stt01tube2450\_0 ovlp=0.0320374

= Overlap ov00146: stt01assembly/stt01tube\_2706 overlapping  
stt01assembly/stt01tube2732\_0 ovlp=0.0318431

= Overlap ov00147: stt01assembly/stt01tube\_2585 overlapping  
stt01assembly/stt01tube2611\_0 ovlp=0.0318412

= Overlap ov00148: Emc3/SubunitVolFwEndCap\_419/BoxVol\_2 overlapping  
Emc3/HalfSubunitVolFwEndCap\_27/BoxVol\_1 ovlp=0.031839

= Overlap ov00149: Emc3/SubunitVolFwEndCap\_219/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_44/BoxVol\_2 ovlp=0.031839

= Overlap ov00150: Emc3/SubunitVolFwEndCap\_119/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_40/BoxVol\_1 ovlp=0.031839

= Overlap ov00151: stt01assembly/stt01tube\_2190 overlapping  
stt01assembly/stt01tube2216\_0 ovlp=0.0306549

= Overlap ov00152: stt01assembly/stt01tube\_2075 overlapping  
stt01assembly/stt01tube2101\_0 ovlp=0.0306549

= Overlap ov00153: stt01assembly/stt01tube\_2465 overlapping  
stt01assembly/stt01tube2490\_0 ovlp=0.0304593

= Overlap ov00154: stt01assembly/stt01tube\_2347 overlapping  
stt01assembly/stt01tube2372\_0 ovlp=0.0304574

= Overlap ov00155: stt01assembly/stt01tube\_1962 overlapping  
stt01assembly/stt01tube1987\_0 ovlp=0.0292729

= Overlap ov00156: stt01assembly/stt01tube\_1850 overlapping  
stt01assembly/stt01tube1875\_0 ovlp=0.0292729

= Overlap ov00157: stt01assembly/stt01tube\_2624 overlapping  
stt01assembly/stt01tube2650\_0 ovlp=0.0282992

= Overlap ov00158: stt01assembly/stt01tube\_2503 overlapping  
stt01assembly/stt01tube2529\_0 ovlp=0.0282973

= Overlap ov00159: stt01assembly/stt01tube\_2114 overlapping  
stt01assembly/stt01tube2137\_0 ovlp=0.0276908

= Overlap ov00160: stt01assembly/stt01tube\_2229 overlapping  
stt01assembly/stt01tube2252\_0 ovlp=0.0276908

= Overlap ov00161: cave/BeamPipe\_0/DipolePip\_0 overlapping  
cave/Ftof\_strips\_0/Ftof\_Central\_Strip14\_14 ovlp=0.0272523

= Overlap ov00162: cave/BeamPipe\_0/DipolePip\_0 overlapping  
cave/Ftof\_strips\_0/Ftof\_Central\_Strip13\_13 ovlp=0.0272523

= Overlap ov00163: stt01assembly/stt01tube\_2385 overlapping stt01assembly/stt01tube2410\_0 ovlp=0.0269206  
= Overlap ov00164: stt01assembly/stt01tube\_2267 overlapping stt01assembly/stt01tube2292\_0 ovlp=0.0269187  
= Overlap ov00165: stt01assembly/stt01tube\_1741 overlapping stt01assembly/stt01tube1764\_0 ovlp=0.0265086  
= Overlap ov00166: stt01assembly/stt01tube\_1635 overlapping stt01assembly/stt01tube1658\_0 ovlp=0.0265086  
= Overlap ov00167: stt01assembly/stt01tube\_1888 overlapping stt01assembly/stt01tube1910\_0 ovlp=0.0263069  
= Overlap ov00168: stt01assembly/stt01tube\_2000 overlapping stt01assembly/stt01tube2022\_0 ovlp=0.0263069  
= Overlap ov00169: Emc3/SubunitVolFwEndCap\_134/BoxVol\_3 overlapping Emc3/HalfSubunitVolFwEndCap\_39/BoxVol\_1 ovlp=0.0251848  
= Overlap ov00170: stt01assembly/stt01tube\_1531 overlapping stt01assembly/stt01tube1553\_0 ovlp=0.0251265  
= Overlap ov00171: stt01assembly/stt01tube\_1428 overlapping stt01assembly/stt01tube1450\_0 ovlp=0.0251265  
= Overlap ov00172: stt01assembly/stt01tube\_1779 overlapping stt01assembly/stt01tube1800\_0 ovlp=0.0249233  
= Overlap ov00173: stt01assembly/stt01tube\_1673 overlapping stt01assembly/stt01tube1694\_0 ovlp=0.0249214  
= Overlap ov00174: Emc3/SubunitVolFwEndCap\_234/BoxVol\_1 overlapping Emc3/HalfSubunitVolFwEndCap\_45/BoxVol\_2 ovlp=0.0245832  
= Overlap ov00175: Emc3/SubunitVolFwEndCap\_334/BoxVol\_4 overlapping Emc3/HalfSubunitVolFwEndCap\_56/BoxVol\_2 ovlp=0.0245832  
= Overlap ov00176: Emc3/SubunitVolFwEndCap\_434/BoxVol\_2 overlapping Emc3/HalfSubunitVolFwEndCap\_28/BoxVol\_2 ovlp=0.0241691  
= Overlap ov00177: Emc3/SubunitVolFwEndCap\_134/BoxVol\_3 overlapping Emc3/HalfSubunitVolFwEndCap\_39/BoxVol\_2 ovlp=0.0241691  
= Overlap ov00178: Emc3/SubunitVolFwEndCap\_234/BoxVol\_1 overlapping Emc3/HalfSubunitVolFwEndCap\_45/BoxVol\_1 ovlp=0.0241691  
= Overlap ov00179: stt01assembly/stt01tube\_2037 overlapping stt01assembly/stt01tube2060\_0 ovlp=0.0241626  
= Overlap ov00180: stt01assembly/stt01tube\_2152 overlapping stt01assembly/stt01tube2175\_0 ovlp=0.0241626  
= Overlap ov00181: stt01assembly/stt01tube\_1328 overlapping stt01assembly/stt01tube1349\_0 ovlp=0.0237442  
= Overlap ov00182: stt01assembly/stt01tube\_1228 overlapping stt01assembly/stt01tube1249\_0 ovlp=0.0237442  
= Overlap ov00183: stt01assembly/stt01tube\_1568 overlapping stt01assembly/stt01tube1588\_0 ovlp=0.0235393  
= Overlap ov00184: stt01assembly/stt01tube\_1465 overlapping stt01assembly/stt01tube1485\_0 ovlp=0.0235374  
= Overlap ov00185: stt01assembly/stt01tube\_1813 overlapping stt01assembly/stt01tube1835\_0 ovlp=0.0227838  
= Overlap ov00186: stt01assembly/stt01tube\_1925 overlapping stt01assembly/stt01tube1947\_0 ovlp=0.0227838  
= Overlap ov00187: stt01assembly/stt01tube\_1130 overlapping stt01assembly/stt01tube1150\_0 ovlp=0.022362  
= Overlap ov00188: stt01assembly/stt01tube\_1033 overlapping stt01assembly/stt01tube1053\_0 ovlp=0.022362

= Overlap ov00189: stt01assembly/stt01tube\_1707 overlapping  
stt01assembly/stt01tube1728\_0 ovlp=0.0214055  
= Overlap ov00190: stt01assembly/stt01tube\_1601 overlapping  
stt01assembly/stt01tube1622\_0 ovlp=0.0214036  
= Overlap ov00191: Emc3/SubunitVolFwEndCap\_326/BoxVol\_2 overlapping  
Emc3/HalfSubunitVolFwEndCap\_56/BoxVol\_1 ovlp=0.0209979  
= Overlap ov00192: Emc3/SubunitVolFwEndCap\_226/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_45/BoxVol\_1 ovlp=0.0209979  
= Overlap ov00193: Emc3/SubunitVolFwEndCap\_126/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_39/BoxVol\_2 ovlp=0.0209979  
= Overlap ov00194: stt01assembly/stt01tube\_1262 overlapping  
stt01assembly/stt01tube1280\_0 ovlp=0.0207708  
= Overlap ov00195: stt01assembly/stt01tube\_1362 overlapping  
stt01assembly/stt01tube1380\_0 ovlp=0.0207708  
= Overlap ov00196: stt01assembly/stt01tube\_1498 overlapping  
stt01assembly/stt01tube1518\_0 ovlp=0.0200266  
= Overlap ov00197: stt01assembly/stt01tube\_1395 overlapping  
stt01assembly/stt01tube1415\_0 ovlp=0.0200247  
= Overlap ov00198: stt01assembly/stt01tube\_1066 overlapping  
stt01assembly/stt01tube1083\_0 ovlp=0.0193869  
= Overlap ov00199: stt01assembly/stt01tube\_1163 overlapping  
stt01assembly/stt01tube1180\_0 ovlp=0.0193869  
= Overlap ov00200: Emc3/SubunitVolFwEndCap\_140/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_38/BoxVol\_1 ovlp=0.0185884  
= Overlap ov00201: Emc3/SubunitVolFwEndCap\_340/BoxVol\_4 overlapping  
Emc3/HalfSubunitVolFwEndCap\_55/BoxVol\_2 ovlp=0.0178632  
= Overlap ov00202: Emc3/SubunitVolFwEndCap\_240/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_46/BoxVol\_2 ovlp=0.0178632  
= Overlap ov00203: Emc3/SubunitVolFwEndCap\_240/BoxVol\_1 overlapping  
Emc3/HalfSubunitVolFwEndCap\_46/BoxVol\_1 ovlp=0.0173616  
= Overlap ov00204: Emc3/SubunitVolFwEndCap\_440/BoxVol\_2 overlapping  
Emc3/HalfSubunitVolFwEndCap\_29/BoxVol\_2 ovlp=0.0173616  
= Overlap ov00205: Emc3/SubunitVolFwEndCap\_140/BoxVol\_3 overlapping  
Emc3/HalfSubunitVolFwEndCap\_38/BoxVol\_2 ovlp=0.0173616  
= Overlap ov00206: stt01assembly/stt01tube\_1195 overlapping  
stt01assembly/stt01tube1213\_0 ovlp=0.0172684  
= Overlap ov00207: stt01assembly/stt01tube\_1295 overlapping  
stt01assembly/stt01tube1313\_0 ovlp=0.0172684  
= Overlap ov00208: stt01assembly/stt01tube\_1001 overlapping  
stt01assembly/stt01tube1018\_0 ovlp=0.0158895  
= Overlap ov00209: stt01assembly/stt01tube\_1098 overlapping  
stt01assembly/stt01tube1115\_0 ovlp=0.0158895  
= Overlap ov00210: Emc3/SubunitVolFwEndCap\_405/BoxVol\_4 overlapping  
Emc3/HalfSubunitVolFwEndCap\_26/BoxVol\_1 ovlp=0.0142737  
= Overlap ov00211: Emc3/SubunitVolFwEndCap\_334/BoxVol\_4 overlapping  
Emc3/HalfSubunitVolFwEndCap\_56/BoxVol\_1 ovlp=0.0121789  
= Overlap ov00212: stt01assembly/stt01tube2410\_0 overlapping  
stt01assembly/stt01tube\_2624 ovlp=0.0117254  
= Overlap ov00213: stt01assembly/stt01tube2292\_0 overlapping  
stt01assembly/stt01tube\_2503 ovlp=0.0117253  
= Overlap ov00214: stt01assembly/stt01tube2332\_0 overlapping  
stt01assembly/stt01tube\_2542 ovlp=0.010436

= Overlap ov00215: stt01assembly/stt01tube2450\_0 overlapping  
 stt01assembly/stt01tube\_2663 ovlp=0.010436  
 = Overlap ov00216: stt01assembly/stt01tube1947\_0 overlapping  
 stt01assembly/stt01tube\_2152 ovlp=0.00992221  
 = Overlap ov00217: stt01assembly/stt01tube1835\_0 overlapping  
 stt01assembly/stt01tube\_2037 ovlp=0.00992071  
 = Overlap ov00218: Emc3/SubunitVolFwEndCap\_140/AlveoleVol\_subunit\_0 overlapping  
 Emc3/HalfSubunitVolFwEndCap\_38/BoxVol\_1 ovlp=0.00985257  
 = Overlap ov00219: stt01assembly/stt01tube2372\_0 overlapping  
 stt01assembly/stt01tube\_2585 ovlp=0.00953153  
 = Overlap ov00220: stt01assembly/stt01tube2490\_0 overlapping  
 stt01assembly/stt01tube\_2706 ovlp=0.00953153  
 = Overlap ov00221: stt01assembly/stt01outerCylinder\_2 overlapping  
 stt01assembly/stt01box\_2 ovlp=0.00905095  
 = Overlap ov00222: stt01assembly/stt01outerCylinder\_1 overlapping  
 stt01assembly/stt01box\_3 ovlp=0.00905095  
 = Overlap ov00223: stt01assembly/stt01outerCylinder\_2 overlapping  
 stt01assembly/stt01box\_4 ovlp=0.00905095  
 = Overlap ov00224: cave/BeamPipe\_0/pipeTSdown\_0 overlapping  
 cave/Gem\_Disks\_0/Gem\_Disk1\_Volume\_0 ovlp=0.00901905  
 = Overlap ov00225: stt01assembly/stt01tube1875\_0 overlapping  
 stt01assembly/stt01tube\_2075 ovlp=0.00891698  
 = Overlap ov00226: stt01assembly/stt01tube1987\_0 overlapping  
 stt01assembly/stt01tube\_2190 ovlp=0.00891698  
 = Overlap ov00227: stt01assembly/stt01tube1518\_0 overlapping  
 stt01assembly/stt01tube\_1707 ovlp=0.00870523  
 = Overlap ov00228: stt01assembly/stt01tube1415\_0 overlapping  
 stt01assembly/stt01tube\_1601 ovlp=0.00870518  
 = Overlap ov00229: stt01assembly/stt01tube1910\_0 overlapping  
 stt01assembly/stt01tube\_2114 ovlp=0.00785795  
 = Overlap ov00230: stt01assembly/stt01tube2022\_0 overlapping  
 stt01assembly/stt01tube\_2229 ovlp=0.00785785  
 = Overlap ov00231: stt01assembly/stt01tube1115\_0 overlapping  
 stt01assembly/stt01tube\_1295 ovlp=0.00685506  
 = Overlap ov00232: stt01assembly/stt01tube1018\_0 overlapping  
 stt01assembly/stt01tube\_1195 ovlp=0.00685353  
 = Overlap ov00233: stt01assembly/stt01tube1485\_0 overlapping  
 stt01assembly/stt01tube\_1673 ovlp=0.0067259  
 = Overlap ov00234: stt01assembly/stt01tube1588\_0 overlapping  
 stt01assembly/stt01tube\_1779 ovlp=0.0067259  
 = Overlap ov00235: cave/BeamPipe\_0/Tcross\_0 overlapping  
 cave/stt01assembly\_0/stt01tube2070\_0 ovlp=0.00672061  
 = Overlap ov00236: stt01assembly/stt01tube1450\_0 overlapping  
 stt01assembly/stt01tube\_1635 ovlp=0.00661876  
 = Overlap ov00237: stt01assembly/stt01tube1553\_0 overlapping  
 stt01assembly/stt01tube\_1741 ovlp=0.00661876  
 = Overlap ov00238: stt01assembly/stt01tube1053\_0 overlapping  
 stt01assembly/stt01tube\_1228 ovlp=0.00507301  
 = Overlap ov00239: stt01assembly/stt01tube1150\_0 overlapping  
 stt01assembly/stt01tube\_1328 ovlp=0.00507301  
 = Overlap ov00240: cave/BeamPipe\_0/Tcross\_0 overlapping  
 cave/stt01assembly\_0/stt01tube1845\_0 ovlp=0.00501348

= Overlap ov00241: stt01assembly/stt01tube1083\_0 overlapping  
stt01assembly/stt01tube\_1262 ovlp=0.00500404  
= Overlap ov00242: stt01assembly/stt01tube1180\_0 overlapping  
stt01assembly/stt01tube\_1362 ovlp=0.00500392  
= Overlap ov00243: cave/BeamPipe\_0/Tcross\_0 overlapping  
cave/stt01assembly\_0/stt01tube2185\_0 ovlp=0.003921  
= Overlap ov00244: Emc3/SubunitVolFwEndCap\_340/BoxVol\_4 overlapping  
Emc3/HalfSubunitVolFwEndCap\_55/BoxVol\_1 ovlp=0.00276907  
= Overlap ov00245: cave/BeamPipe\_0/Tcross\_0 overlapping  
cave/stt01assembly\_0/stt01tube1957\_0 ovlp=0.00220847

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Subject: Re: geometry overlaps for PANDA subdetectors  
Posted by [Prometeusz Jasinski](#) on Thu, 01 Aug 2013 18:23:08 GMT  
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Thank you for your efforts.

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