

Geant4 Code for Ecrates and Icrates

Release 8

21/06/2010

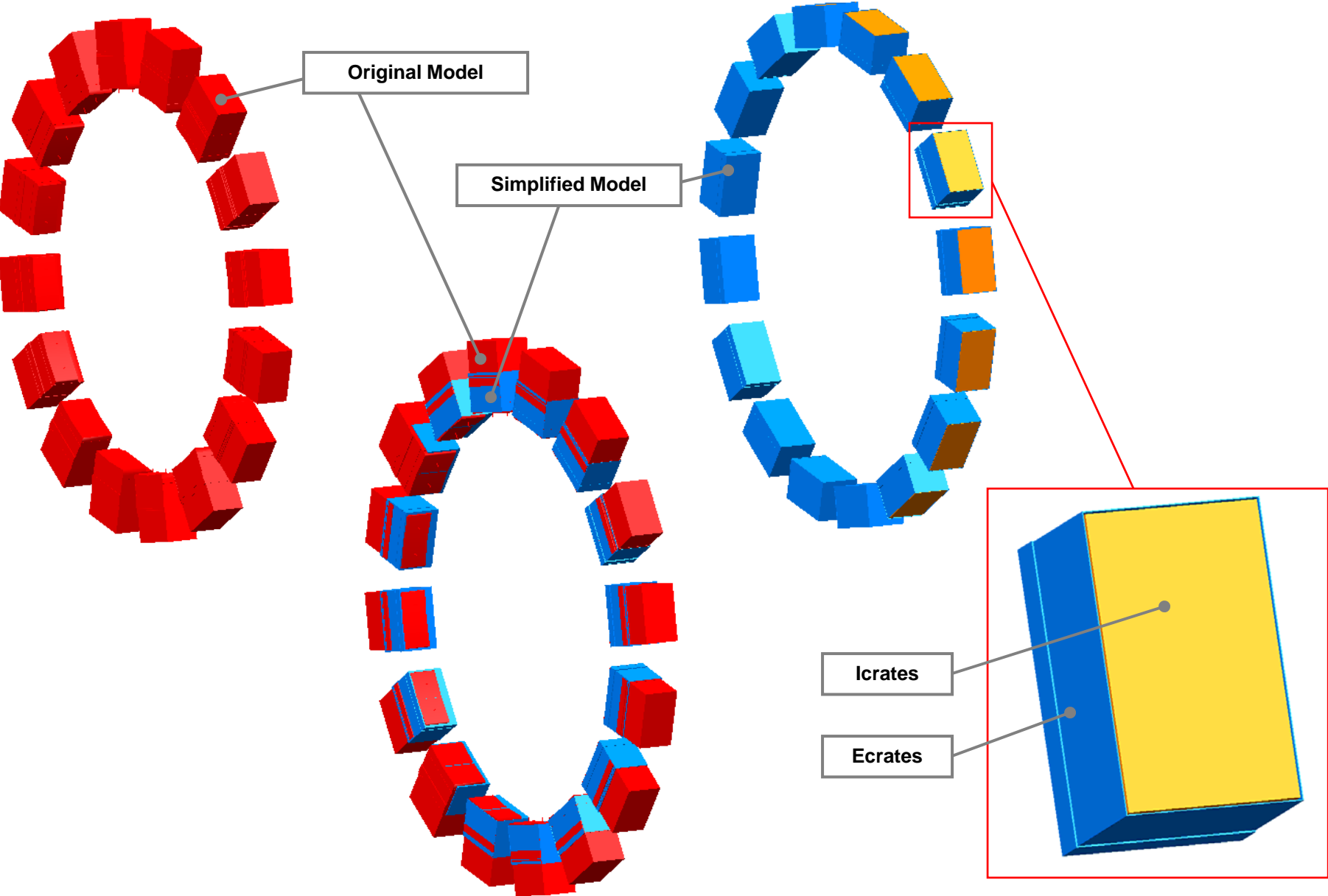
Alexander Sharmazanashvili

Archil Surmava

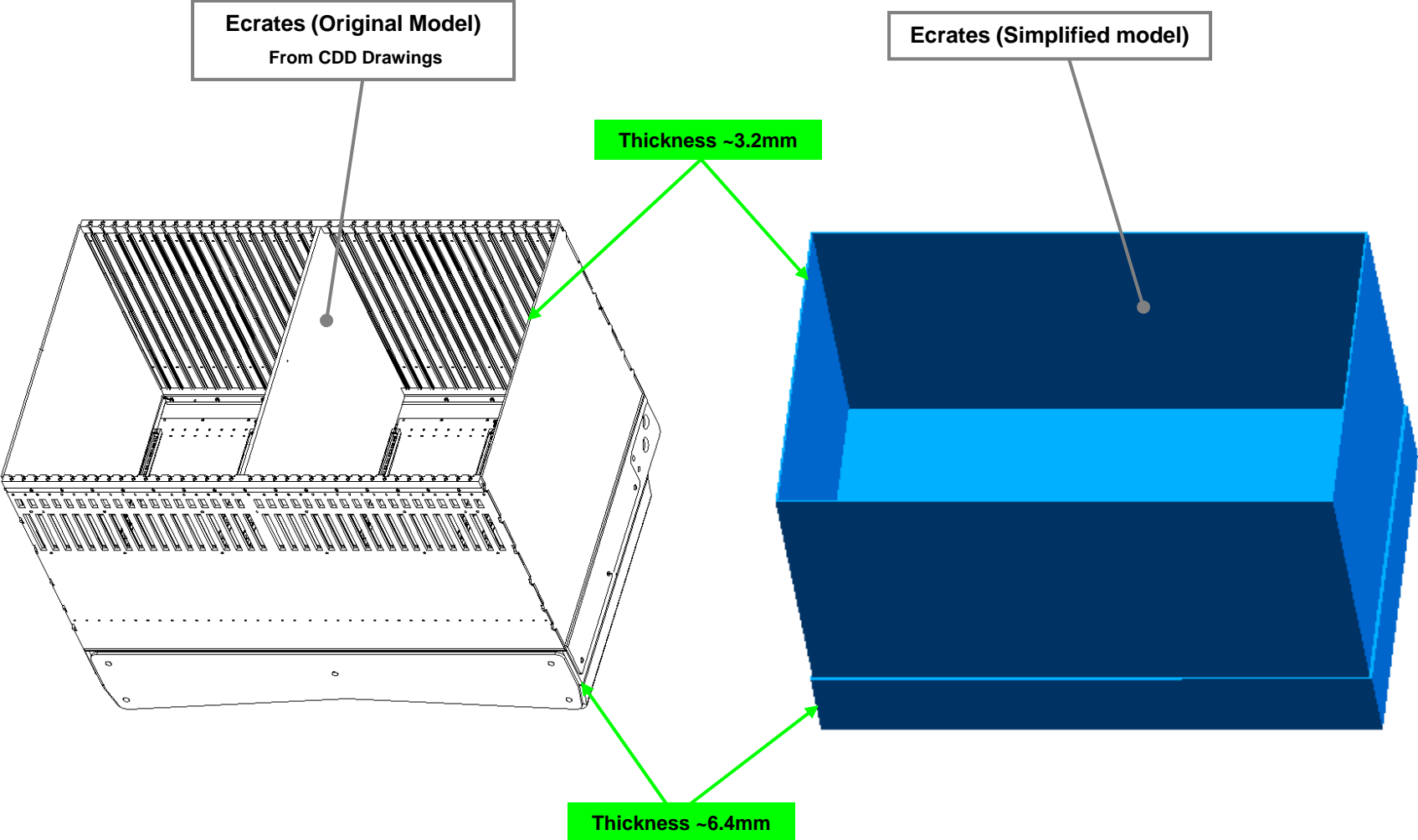
Besik Kekelia

GCCEC www.cadcam.ge

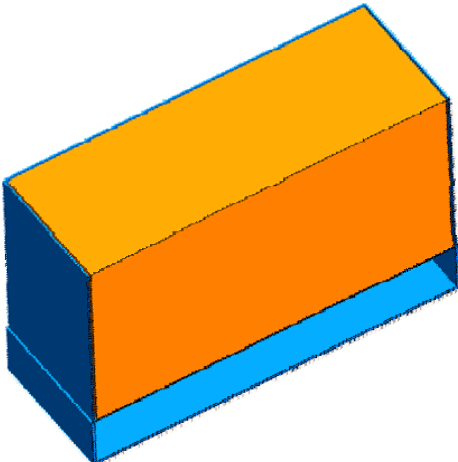
Ecrates, Icrates



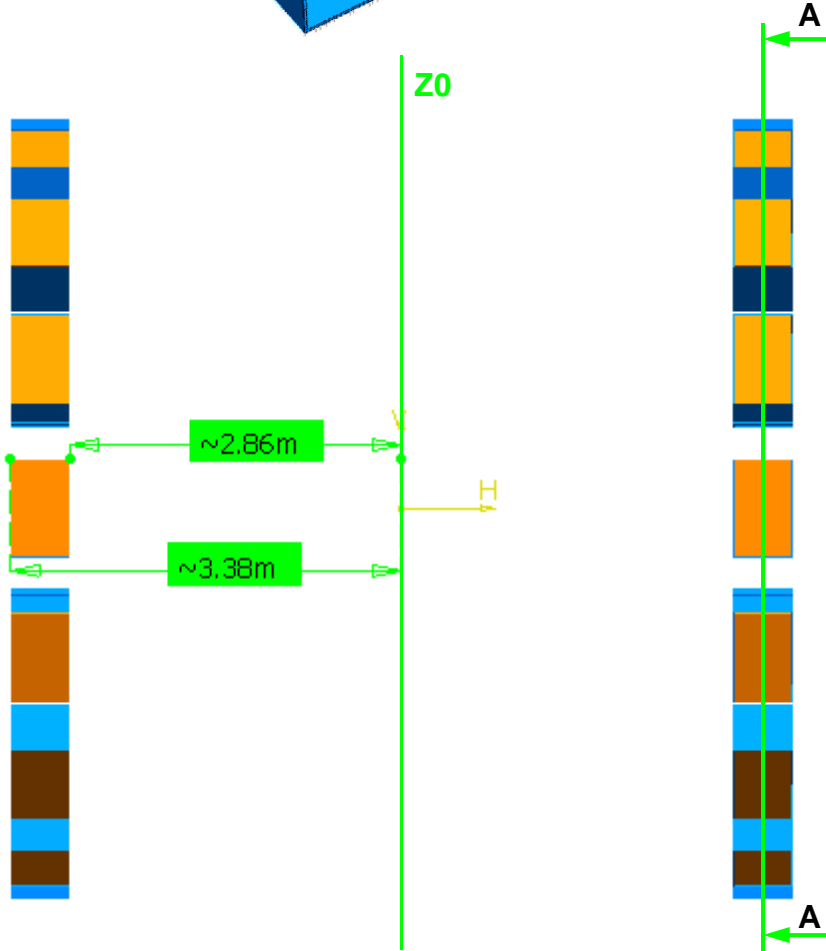
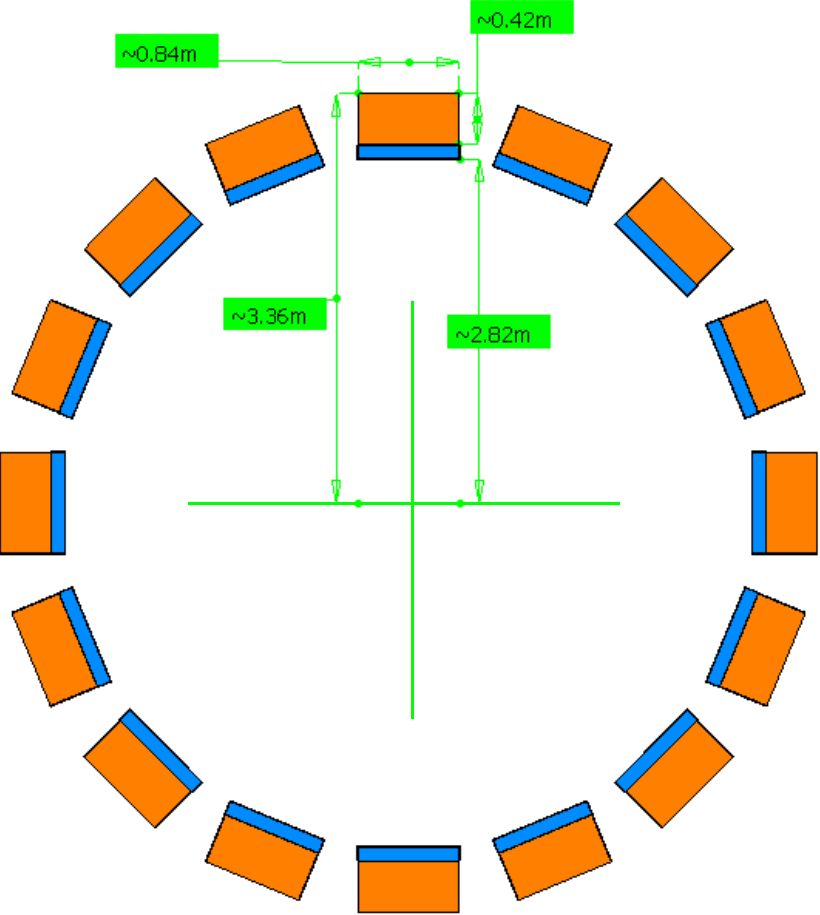
Ecrates



Ecrates and Icrates (Simplified Model)



Section A-A



Ecrates Geant4 Code

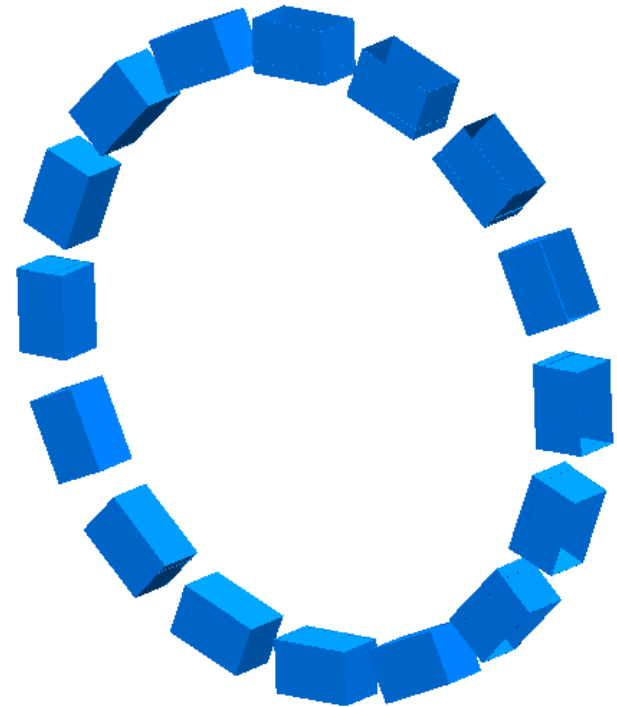
```
G4VPhysicalVolume* ExN10::Construct()
{
//----- materials
G4double a; // atomic mass
G4double z; // atomic number
G4double density;
G4int nel;
G4Material* Al = new G4Material("Aluminum", z= 13., a= 26.98*g/mole, density= 2.7*g/cm3);
G4Material* Air = new G4Material("Air", density= 1.29*mg/cm3, nel=2);

//-----World volume
solidWorld= new G4Box("World",1*mm,1*mm,1*mm);
logicWorld= new G4LogicalVolume( solidWorld, Air, "World", 0, 0, 0);
physiWorld = new G4PVPlacement(0, G4ThreeVector(), logicWorld, "World", 0, true, 0);

//-----Ecrates volumes
Part[1] = new G4Box("Box2",421.4*mm, 256.4*mm, 60*mm);
Part[2] = new G4Box("Box1",415*mm, 250*mm, 60*mm);
G4VSolid *Box1 = new G4DisplacedSolid("displacedBox",Part[1],0,G4ThreeVector(0,0,-210));
G4VSolid *EIBox1= new G4SubtractionSolid("EIBox",Box1,Part[2],0,G4ThreeVector( 0, 0, -203.6));

Part[3] = new G4Box("Box2",418.2*mm, 253.2*mm, 210*mm);
Part[4] = new G4Box("Box1",415*mm, 250*mm, 210*mm);
G4VSolid *Box2 = new G4DisplacedSolid("displacedBox",Part[3],0,G4ThreeVector(0,0,60));
G4VSolid *EIBox2= new G4SubtractionSolid("EIBox",Box2,Part[4],0,G4ThreeVector( 0, 0, 63.2));
G4VSolid *EIBox3= new G4UnionSolid("EIBox",EIBox1,EIBox2,0,G4ThreeVector( 0, 0, 0));
Part_log[2]=new G4LogicalVolume(EIBox3, Al, "www", 0, 0, 0);

Part_phys[2]= new G4PVPlacement(0, G4ThreeVector(0, -3119.02, 3086.65), Part_log[2], "qqq", logicWorld, true, 1);
G4RotationMatrix *rm2 = new G4RotationMatrix;
rm2->rotate(-0.392699,G4ThreeVector( -9.59315e-017, 1, 1.90819e-017));
Part_phys[2]= new G4PVPlacement(rm2, G4ThreeVector( 1181.21, -3119.02, 2851.69),Part_log[2], "qqq", logicWorld, true, 2);
G4RotationMatrix *rm3 = new G4RotationMatrix;
rm3->rotate(-0.785398,G4ThreeVector(-4.60679e-017, 1, 1.9082e-017));
Part_phys[2]= new G4PVPlacement(rm3, G4ThreeVector(2182.59, -3119.02, 2182.59),Part_log[2], "qqq", logicWorld, true, 3);
G4RotationMatrix *rm4 = new G4RotationMatrix;
rm4->rotate(-1.1781,G4ThreeVector(-2.83185e-017, 1, 2.17008e-017));
Part_phys[2]= new G4PVPlacement(rm4, G4ThreeVector(2851.69, -3119.02, 1181.21),Part_log[2], "qqq", logicWorld, true, 4);
Part_phys[2]= new G4PVPlacement(rm6, G4ThreeVector( 2851.69, -3119.02, -1181.21),Part_log[2], "qqq", logicWorld, true, 6);
```



Ecrates Geant4 Code

```
G4RotationMatrix *rm5 = new G4RotationMatrix;
rm5->rotate(-1.5708,G4ThreeVector(-1.87915e-017, 1, 2.07839e-017));
Part_phys[2]= new G4PVPlacement(rm5, G4ThreeVector(3086.65, -3119.02, -1.59162e-012),Part_log[2], "qqq", logicWorld, true, 5);
G4RotationMatrix *rm6 = new G4RotationMatrix;
rm6->rotate(-1.9635,G4ThreeVector(-1.24212e-017, 1, 2.03305e-017));
G4RotationMatrix *rm7 = new G4RotationMatrix;
rm7->rotate(-2.35619,G4ThreeVector(-7.54319e-018, 1, 2.00695e-017));
Part_phys[2]= new G4PVPlacement(rm7, G4ThreeVector(2182.59, -3119.02, -2182.59),Part_log[2], "qqq", logicWorld, true, 7);
G4RotationMatrix *rm8 = new G4RotationMatrix;
rm8->rotate(-2.74889,G4ThreeVector(-3.40614e-018, 1, 1.99068e-017));
Part_phys[2]= new G4PVPlacement(rm8, G4ThreeVector(1181.21, -3119.02, -2851.69),Part_log[2], "qqq", logicWorld, true, 8);
G4RotationMatrix *rm9 = new G4RotationMatrix;
rm9->rotate(3.14159,G4ThreeVector(4.17342e-019, 1, 1.98041e-017));
Part_phys[2]= new G4PVPlacement(rm9, G4ThreeVector(-1.59162e-012, -3119.02, -3086.65),Part_log[2], "qqq", logicWorld, true, 9);
G4RotationMatrix *rm10 = new G4RotationMatrix;
rm10->rotate(2.74889,G4ThreeVector(4.24212e-018, 1, 1.97473e-017 ));
Part_phys[2]= new G4PVPlacement(rm10, G4ThreeVector(-1181.21, -3119.02, -2851.69),Part_log[2], "qqq", logicWorld, true, 10);
G4RotationMatrix *rm11 = new G4RotationMatrix;
rm11->rotate(2.35619,G4ThreeVector(8.3835e-018, 1, 1.97374e-017));
Part_phys[2]= new G4PVPlacement(rm11, G4ThreeVector(-2182.59, -3119.02, -2182.59),Part_log[2], "qqq", logicWorld, true, 11);
G4RotationMatrix *rm12 = new G4RotationMatrix;
rm12->rotate(1.9635,G4ThreeVector(1.32705e-017, 1, 1.97947e-017));
Part_phys[2]= new G4PVPlacement(rm12, G4ThreeVector(-2851.69, -3119.02, -1181.21),Part_log[2], "qqq", logicWorld, true, 12);
G4RotationMatrix *rm13 = new G4RotationMatrix;
rm13->rotate(1.5708,G4ThreeVector(1.9659e-017, 1, 1.99821e-017));
Part_phys[2]= new G4PVPlacement(rm13, G4ThreeVector(-3086.65, -3119.02, 1.59162e-012),Part_log[2], "qqq", logicWorld, true, 13);
G4RotationMatrix *rm14 = new G4RotationMatrix;
rm14->rotate(1.1781,G4ThreeVector(2.92267e-017, 1, 2.05007e-017 ));
Part_phys[2]= new G4PVPlacement(rm14, G4ThreeVector(-2851.69, -3119.02, 1181.21),Part_log[2], "qqq", logicWorld, true, 14);
G4RotationMatrix *rm15 = new G4RotationMatrix;
rm15->rotate(0.785398,G4ThreeVector(4.69267e-017, 1, 2.22102e-017 ));
Part_phys[2]= new G4PVPlacement(rm15, G4ThreeVector(-2182.59, -3119.02, 2182.59),Part_log[2], "qqq", logicWorld, true, 15);
G4RotationMatrix *rm16 = new G4RotationMatrix;
rm16->rotate(0.392699,G4ThreeVector(9.74836e-017, 1, 3.24194e-017 ));
Part_phys[2]= new G4PVPlacement(rm16, G4ThreeVector(-1181.21, -3119.02, 2851.69),Part_log[2], "qqq", logicWorld, true, 16);
return physiWorld;
}
```

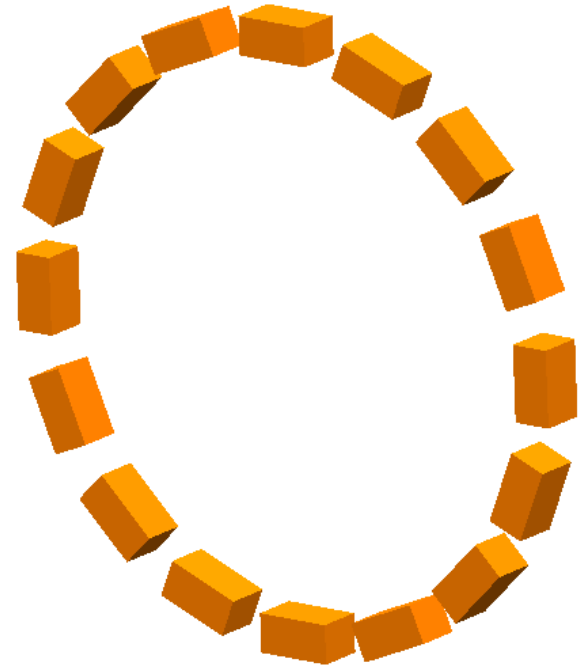
Icrates Geant4 Code

```
G4VPhysicalVolume* ExN10::Construct()
{
//----- materials
G4double a; // atomic mass
G4double z; // atomic number
G4double density;
G4int nel;
G4Material* Air = new G4Material("Air", density= 1.29*mg/cm3, nel=2);

//-----World volume
solidWorld= new G4Box("World",1*mm,1*mm,1*mm);
logicWorld= new G4LogicalVolume( solidWorld, Air, "World", 0, 0, 0);
physiWorld = new G4PVPlacement(0, G4ThreeVector(), logicWorld, "World", 0, true, 0);

//-----Icrates volumes
Part[2] = new G4Box("Box1",410*mm, 245*mm, 208*mm);
G4VSolid *Box1 = new G4DisplacedSolid("displacedBox",Part[2],0,G4ThreeVector(0,0,62));
Part_log[2]=new G4LogicalVolume(Box1, Air, "www", 0, 0, 0);

Part_phys[2]= new G4PVPlacement(0, G4ThreeVector(0, -3119.02, 3086.65), Part_log[2], "qqq", logicWorld, true, 1);
G4RotationMatrix *rm2 = new G4RotationMatrix;
rm2->rotate(-0.392699,G4ThreeVector( -9.59315e-017, 1, 1.90819e-017));
Part_phys[2]= new G4PVPlacement(rm2, G4ThreeVector( 1181.21, -3119.02, 2851.69),Part_log[2], "qqq", logicWorld, true, 2);
G4RotationMatrix *rm3 = new G4RotationMatrix;
rm3->rotate(-0.785398,G4ThreeVector(-4.60679e-017, 1, 1.9082e-017));
Part_phys[2]= new G4PVPlacement(rm3, G4ThreeVector(2182.59, -3119.02, 2182.59),Part_log[2], "qqq", logicWorld, true, 3);
G4RotationMatrix *rm4 = new G4RotationMatrix;
rm4->rotate(-1.1781,G4ThreeVector(-2.83185e-017, 1, 2.17008e-017));
Part_phys[2]= new G4PVPlacement(rm4, G4ThreeVector(2851.69, -3119.02, 1181.21),Part_log[2], "qqq", logicWorld, true, 4);
G4RotationMatrix *rm5 = new G4RotationMatrix;
rm5->rotate(-1.5708,G4ThreeVector(-1.87915e-017, 1, 2.07839e-017));
Part_phys[2]= new G4PVPlacement(rm5, G4ThreeVector(3086.65, -3119.02, -1.59162e-012),Part_log[2], "qqq", logicWorld, true, 5);
G4RotationMatrix *rm6 = new G4RotationMatrix;
rm6->rotate(-1.9635,G4ThreeVector(-1.24212e-017, 1, 2.03305e-017));
Part_phys[2]= new G4PVPlacement(rm6, G4ThreeVector( 2851.69, -3119.02, -1181.21),Part_log[2], "qqq", logicWorld, true, 6);
G4RotationMatrix *rm7 = new G4RotationMatrix;
rm7->rotate(-2.35619,G4ThreeVector(-7.54319e-018, 1, 2.00695e-017));
Part_phys[2]= new G4PVPlacement(rm7, G4ThreeVector(2182.59, -3119.02, -2182.59),Part_log[2], "qqq", logicWorld, true, 7);
```



Icrates Geant4 Code

```
G4RotationMatrix *rm8 = new G4RotationMatrix;
rm8->rotate(-2.74889,G4ThreeVector(-3.40614e-018, 1, 1.99068e-017));
Part_phys[2]= new G4PVPlacement(rm8, G4ThreeVector(1181.21, -3119.02, -2851.69),Part_log[2], "qqq", logicWorld, true, 8);
G4RotationMatrix *rm9 = new G4RotationMatrix;
rm9->rotate(3.14159,G4ThreeVector(4.17342e-019, 1, 1.98041e-017));
Part_phys[2]= new G4PVPlacement(rm9, G4ThreeVector(-1.59162e-012, -3119.02, -3086.65),Part_log[2], "qqq", logicWorld, true, 9);
G4RotationMatrix *rm10 = new G4RotationMatrix;
rm10->rotate(2.74889,G4ThreeVector(4.24212e-018, 1, 1.97473e-017 ));
Part_phys[2]= new G4PVPlacement(rm10, G4ThreeVector(-1181.21, -3119.02, -2851.69),Part_log[2], "qqq", logicWorld, true, 10);
G4RotationMatrix *rm11 = new G4RotationMatrix;
rm11->rotate(2.35619,G4ThreeVector(8.3835e-018, 1, 1.97374e-017));
Part_phys[2]= new G4PVPlacement(rm11, G4ThreeVector(-2182.59, -3119.02, -2182.59),Part_log[2], "qqq", logicWorld, true, 11);
G4RotationMatrix *rm12 = new G4RotationMatrix;
rm12->rotate(1.9635,G4ThreeVector(1.32705e-017, 1, 1.97947e-017));
Part_phys[2]= new G4PVPlacement(rm12, G4ThreeVector(-2851.69, -3119.02, -1181.21),Part_log[2], "qqq", logicWorld, true, 12);
G4RotationMatrix *rm13 = new G4RotationMatrix;
rm13->rotate(1.5708,G4ThreeVector(1.9659e-017, 1, 1.99821e-017));
Part_phys[2]= new G4PVPlacement(rm13, G4ThreeVector(-3086.65, -3119.02, 1.59162e-012),Part_log[2], "qqq", logicWorld, true, 13);
G4RotationMatrix *rm14 = new G4RotationMatrix;
rm14->rotate(1.1781,G4ThreeVector(2.92267e-017, 1, 2.05007e-017 ));
Part_phys[2]= new G4PVPlacement(rm14, G4ThreeVector(-2851.69, -3119.02, 1181.21),Part_log[2], "qqq", logicWorld, true, 14);
G4RotationMatrix *rm15 = new G4RotationMatrix;
rm15->rotate(0.785398,G4ThreeVector(4.69267e-017, 1, 2.22102e-017 ));
Part_phys[2]= new G4PVPlacement(rm15, G4ThreeVector(-2182.59, -3119.02, 2182.59),Part_log[2], "qqq", logicWorld, true, 15);
G4RotationMatrix *rm16 = new G4RotationMatrix;
rm16->rotate(0.392699,G4ThreeVector(9.74836e-017, 1, 3.24194e-017 ));
Part_phys[2]= new G4PVPlacement(rm16, G4ThreeVector(-1181.21, -3119.02, 2851.69),Part_log[2], "qqq", logicWorld, true, 16);
return physiWorld;
}
```


Compare report (main page)

ATLAS DMU Web

El. Boxes (Side A)/CHECKING

Compare Model Name

Approval :

By :

Engineer : Archil Surmava

Department : CATIA Engineering Center (Georgia)

Date : 17/06/2010

Compare model with
Mass analysis

Completeness:

Status : Checked

CATPart.wrl : Fine

Geant4.wrl : Fine

Report : Available

Visualization :

Link of Geometrical
analysis

Geometry:

Mass Analysis

Parameter	Geant4 Model	CATIA Model	Deviation
Volume (m ³)	30.22m3	0.15m3	30.07
Square (m ²)	59.81m2	59.81m2	0
Center of Gravitation (mm)	x: 0m	x: 1.03e-008m	0
	y: -3.12m	y: -3.12m	0
	z: 0.86m	z: 2.69e-007m	0

Compare report (Geometrical analysis page)

Published Report

Done by GCCEC
18/06/2010

Computational accuracy: 20mm

AddedMaterials are due to computational inaccuracy.

AddedMaterial (Box-Geant4.Box):

Image 1



RemovedMaterials are due to computational inaccuracy.

RemovedMaterials (Geant4.Box-Box):

Image 2



Box:

Image 3



Geant4.Box:

Image 4

