

```
#####  
#  
# NaI Cross-Collimator #  
#  
# Chris Velissaris #  
# 2020-12 #  
# #  
#####
```

```
#  
# V I S U A L I S A T I O N  
#
```

```
#/vis/open OGLSX  
#/vis/open OGLIX  
#/vis/viewer/reset  
#/vis/viewer/set/viewpointThetaPhi 60 60  
#/vis/viewer/zoom 0  
#/vis/viewer/set/style surface  
#/vis/drawVolume  
#/tracking/storeTrajectory 1  
#/vis/scene/endOfEventAction accumulate  
#/vis/viewer/update  
#/gate/geometry/enableAutoUpdate  
/gate/geometry/setMaterialDatabase  
/home/tpanagiotakopoulos/velissaris/test/GateMaterials.db
```

```
#  
# W O R L D  
#
```

```
/gate/world/geometry/setXLength 20 cm  
/gate/world/geometry/setYLength 20 cm  
/gate/world/geometry/setZLength 25 cm
```

```
#  
# Detector Volumes  
#
```

```
/gate/world/daughters/name SPECThead  
/gate/world/daughters/insert cylinder  
/gate/SPECThead/geometry/setRmin 0.00 cm  
/gate/SPECThead/geometry/setRmax 10.00 cm  
/gate/SPECThead/geometry/setHeight 25.00 cm  
/gate/SPECThead/placement/setTranslation 0.00 0.00 0.00 cm  
/gate/SPECThead/setMaterial Air  
#/gate/SPECThead/vis/setColor white  
#/gate/SPECThead/vis/forceWireframe
```

```
/gate/SPECThead/daughters/name Det
/gate/SPECThead/daughters/insert cylinder
/gate/Det/geometry/setRmin          0.00 cm
/gate/Det/geometry/setRmax          2.54 cm
/gate/Det/geometry/setHeight        5.08 cm
/gate/Det/placement/setTranslation  0.00 0.00 2.54 cm
/gate/Det/setMaterial NaI
#/gate/Det/vis/setColor blue
#/gate/Det/vis/forceSolid
#/gate/geometry/SetMaterialDataBase /home/cvelissaris/fromTheo/GateMaterials.db
```

```
#/gate/SPECThead/daughters/name Win
#/gate/SPECThead/daughters/insert cylinder
#/gate/Win/geometry/setRmin          0.00 cm
#/gate/Win/geometry/setRmax          2.73 cm
#/gate/Win/geometry/setHeight        0.05 cm
#/gate/Win/placement/setTranslation  0.00 0.00 -0.20 cm
#/gate/Win/setMaterial Aluminium
#/gate/Win/vis/setColor yellow
#/gate/Win/vis/forceSolid
```

```
/gate/SPECThead/daughters/name Col
/gate/SPECThead/daughters/insert box
/gate/Col/geometry/setXLength        6.00 cm
/gate/Col/geometry/setYLength        6.00 cm
/gate/Col/geometry/setZLength        4.90 cm
/gate/Col/placement/setTranslation  0.00 0.00 -2.60 cm
/gate/Col/setMaterial Lead
#/gate/Col/vis/setColor red
#/gate/Col/vis/forceWireframe
```

```
/gate/Col/daughters/name Hole1
/gate/Col/daughters/insert cylinder
/gate/Hole1/geometry/setRmin          0.00 cm
/gate/Hole1/geometry/setRmax          0.50 cm
/gate/Hole1/geometry/setHeight        4.90 cm
/gate/Hole1/placement/setTranslation  0.00 0.00 0.00 cm
/gate/Hole1/setMaterial Air
```

```
/gate/Col/daughters/name Hole2
/gate/Col/daughters/insert cylinder
/gate/Hole2/geometry/setRmin          0.00 cm
/gate/Hole2/geometry/setRmax          0.50 cm
/gate/Hole2/geometry/setHeight        4.90 cm
/gate/Hole2/placement/setTranslation  1.25 0.00 0.00 cm
/gate/Hole2/setMaterial Air
```

```
/gate/Col/daughters/name Hole3
/gate/Col/daughters/insert cylinder
/gate/Hole3/geometry/setRmin          0.00 cm
```

```
/gate/Hole3/geometry/setRmax      0.50 cm
/gate/Hole3/geometry/setHeight    4.90 cm
/gate/Hole3/placement/setTranslation -1.25  0.00  0.00 cm
/gate/Hole3/setMaterial Air
```

```
/gate/Col/daughters/name Hole4
/gate/Col/daughters/insert cylinder
/gate/Hole4/geometry/setRmin      0.00 cm
/gate/Hole4/geometry/setRmax     0.50 cm
/gate/Hole4/geometry/setHeight    4.90 cm
/gate/Hole4/placement/setTranslation 0.00  1.25  0.00 cm
/gate/Hole4/setMaterial Air
```

```
/gate/Col/daughters/name Hole5
/gate/Col/daughters/insert cylinder
/gate/Hole5/geometry/setRmin     0.00 cm
/gate/Hole5/geometry/setRmax     0.50 cm
/gate/Hole5/geometry/setHeight    4.90 cm
/gate/Hole5/placement/setTranslation 0.00 -1.25  0.00 cm
/gate/Hole5/setMaterial Air
```

```
/gate/SPECThead/daughters/name Scat
/gate/SPECThead/daughters/insert box
/gate/Scat/geometry/setXLength    1.00 cm
/gate/Scat/geometry/setYLength    1.00 cm
/gate/Scat/geometry/setZLength    1.00 cm
/gate/Scat/placement/setTranslation 0.00  0.00 -10.60 cm
/gate/Scat/setMaterial Lead
#/gate/Scat/vis/setColor yellow
```

```
#-----oooooooooooooooooooooooo-----#
#
#           S E N S I T I V E   D E T E C T O R           #
#
#
#
#-----oooooooooooooooooooooooo-----#
```

```
#
# Crystal SD
#
```

```
/gate/systems/SPECThead/crystal/attach Det
/gate/Det/attachCrystalSD
```

```
#-----oooooooooooooooooooooooo-----#
#
#
```

```
#   D E F I N I T I O N   A N D   D E S C R I P T I O N           #
#           O F   Y O U R   P H Y S I C S                       #
#                                                                 #
#-----oooooooooooooooooooooooooooooooooooooooo-----#
```

```
#   E M   P R O C E S S

#/gate/physics/processes/RayleighScattering/ gamma
#/gate/physics/processes/selectPhotoelectric lowenergy
#/gate/physics/processes/selectCompton lowenergy

/gate/physics/addProcess RayleighScattering gamma
/gate/physics/processes/RayleighScattering/setModel LivermoreModel
```

```
#I N A C T I V E   S E C O N D A R Y   E L E C T R O N S

# /gate/physics/setElectronCut 100 m
```

```
#I N A C T I V E   X - R A Y S

# /gate/physics/setXRayCut 1. GeV
# /gate/physics/setDeltaRayCut 1. GeV
```

```
#-----oooooooooooooooooooooooooooooooooooooooo-----#
#                                                                 #
#   I N I T I A L I Z A T I O N   O F   Y O U R                 #
#           S I M U L A T I O N                               #
#                                                                 #
#-----oooooooooooooooooooooooooooooooooooooooo-----#
```

```
#/gate/geometry/enableAutoUpdate
/run/initialize
```

```
#-----oooooooooooooooooooooooooooooooooooooooo-----#
#                                                                 #
#   D E F I N I T I O N   O F   Y O U R   A C Q U I S I T I O N #
#   D I G I T I Z E R   &   C O I N C I D E N C E   S H O R T E R #
#                                                                 #
#-----oooooooooooooooooooooooooooooooooooooooo-----#
```

```
/gate/output/digi/enable
```

```
#A D D E R
/gate/digitizer/Singles/insert adder
```

```

#      R E A D O U T
# /gate/digitizer/Singles/insert readout
# /gate/digitizer/Singles/readout/setDepth 1

#      E N E R G Y   B L U R R I N G
/gate/digitizer/Singles/insert blurring
/gate/digitizer/Singles/blurring/setResolution 0.075
/gate/digitizer/Singles/blurring/setEnergyOfReference 662. keV

#      E N E R G Y   C U T
# /gate/digitizer/Singles/insert thresholder
# /gate/digitizer/Singles/thresholder/setThreshold 50. keV
# /gate/digitizer/Singles/insert upholder
# /gate/digitizer/Singles/upholder/setUphold 250. keV

#-----oooooooooooooooooooooooo-----#
#
#           D E F I N I T I O N   O F           #
#           Y O U R   O U T P U T   F I L E           #
#
#-----oooooooooooooooooooooooo-----#

/gate/output/analysis/enable
/gate/output/ascii/enable
/gate/output/root/disable
/gate/output/projection/disable
/gate/output/interfile/disable

# /gate/output/sinogram/disable
# /gate/output/ecat7/disable
# /gate/output/lmf1/disable

#      C H A N G E   T H E   S E E D (1) O R   N O T (0)

# /gate/output/root/setSaveRndmFlag 1

#      S E T U P   -   R O O T   _   F I L E

# /gate/output/root/setFileName Your_SPECT_Simu
# /gate/output/root/setRootSinglesAdderFlag 0
# /gate/output/root/setRootSinglesBlurringFlag 0
# /gate/output/root/setRootSinglesThresholderFlag 0
# /gate/output/root/setRootSinglesUpholderFlag 0

#      S E T U P   -   A S C I I   _   F I L E

```

```
# /gate/output/ascii/setOutFileSinglesAdderFlag 0
# /gate/output/ascii/setOutFileSinglesBlurringFlag 0
# /gate/output/ascii/setOutFileSinglesThresholderFlag 0
# /gate/output/ascii/setOutFileSinglesUpholderFlag 0
/gate/output/ascii/setFileName ChrisFile
/gate/output/ascii/setOutFileSinglesFlag 1
/gate/output/ascii/setOutFileHitsFlag 0
```

```
#           I N T E R F I L E   P R O J E C T I O N
```

```
# /gate/output/projection/pixelSizeX 0.904 mm
# /gate/output/projection/pixelSizeY 0.904 mm
# /gate/output/projection/pixelNumberX 128
# /gate/output/projection/pixelNumberY 128
```

```
# Specify the projection plane (XY, YZ or ZX)
```

```
# /gate/output/projection/projectionPlane YZ
```

```
#-----oooooooooooooooooooooooooooooooo-----#
#
#           D E F I N I T I O N   O F           #
#           Y O U R   V E R B O S I T Y   L E V E L           #
#
#-----oooooooooooooooooooooooooooooooo-----#
```

```
#/control/verbose 0
#/grdm/verbose 0
#/run/verbose 0
#/event/verbose 0
#/tracking/verbose 0
#/gate/application/verbose 0
#/gate/generator/verbose 0
#/gate/stacking/verbose 0
##/gate/event/verbose 0
#/gate/verbose 0
#/gate/source/verbose 0
```

```
#-----oooooooooooooooooooooooooooooooo-----#
#
#           D E F I N I T I O N   O F           #
#           Y O U R   S O U R C E S           #
#
#-----oooooooooooooooooooooooooooooooo-----#
```

```
#           G A M M A
```

```
/gate/source/addSource Cs0
/gate/source/Cs0/gps/pos/type Volume
/gate/source/Cs0/gps/pos/shape Cylinder
/gate/source/Cs0/gps/pos/radius 0.05 cm
/gate/source/Cs0/gps/pos/halfz 0.05 cm
/gate/source/Cs0/gps/pos/centre 0.00 0.00 -10.00 cm
/gate/source/Cs0/gps/particle gamma
/gate/source/Cs0/gps/energy 662.0 keV
/gate/source/Cs0/setActivity 10000. Bq
/gate/source/Cs0/gps/ang/type iso
/gate/source/Cs0/gps/ang/mintheta 0. deg
/gate/source/Cs0/gps/ang/maxtheta 180. deg
/gate/source/Cs0/gps/ang/minphi 0. deg
/gate/source/Cs0/gps/ang/maxphi 360. deg
```

```
#-----oooooooooooooooooooooooo-----#
#
#           S T A R T   A C Q U I S I T I O N
#           T I M E   P A R A M E T E R S
#
#-----oooooooooooooooooooooooo-----#
```

```
#
#           E X P E R I M E N T
#
```

```
#/random/setSavingFlag 0
#/random/resetEngineFrom currentEvent.rndm
```

```
/gate/application/setTimeSlice 1.00 s
/gate/application/setTimeStart 0.00 s
/gate/application/setTimeStop 7000.00 s
```

```
/gate/application/startDAQ
```

```
#-----#
# E X I T #
#-----#
```

```
exit
```