

Progress Update

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mPMT Progress

- Having trouble getting in touch with Tom
 - Would like to hear his take on “events of interest” I showed a few weeks ago

Normal Event (debug mode)

```
Photon at Boundary!  
thePrePV: WBarrel  
thePostPV: WBarrelCell  
Old Momentum Direction: (-1,0,0)  
Old Polarization: (0,0.257658,-0.966236)  
*** SameMaterial ***  
Photon at Boundary!  
thePrePV: WBarrelCell  
thePostPV: WBarrelCellBlackSheet  
Old Momentum Direction: (-1,0,0)  
Old Polarization: (0,0.257658,-0.966236)  
New Momentum Direction: (-1,0,0)  
New Polarization: (0,0.257658,-0.966236)  
*** Absorption ***  
WCSimWCDigitizerSKI::DigitizeHits START WCHCPMT->entries() = 0  
WCSimWCDigitizerSKI::DigitizeHits END DigiStore->entries() 0  
WCSimWCTriggerBase::AlgNDigits. Number of entries in input digit collection: 0  
Found 0 NDigit triggers  
Filling Root Event  
RAW HITS  
ngates = 0
```

Event of Interest

```
Photon at Boundary!  
thePrePV: WCBarel  
thePostPV: WCBarelCell  
Old Momentum Direction: (-1,0,0)  
Old Polarization: (0,0.877152,0.480214)  
*** SameMaterial ***  
Photon at Boundary!  
thePrePV: WCBarelCell  
thePostPV: WCMultiPMT  
Old Momentum Direction: (-1,0,0)  
Old Polarization: (0,0.877152,0.480214)  
*** SameMaterial ***  
Photon at Boundary!  
thePrePV: WCMultiPMT  
thePostPV: WCPMT_vessel  
Old Momentum Direction: (-1,0,0)  
Old Polarization: (0,0.877152,0.480214)  
New Momentum Direction: (-0.996284,0.0599589,0.0618264)  
New Polarization: (0.0823095,0.874175,0.478584)  
*** FresnelRefraction ***  
Photon at Boundary!  
thePrePV: WCPMT_vessel  
thePostPV: WCPMT_container  
Old Momentum Direction: (-0.996284,0.0599589,0.0618264)  
Old Polarization: (0.0823095,0.874175,0.478584)  
New Momentum Direction: (-0.999477,0.0225055,0.0232065)  
New Polarization: (0.0308986,0.876103,0.481133)  
*** FresnelRefraction ***  
WCSimWCDigitizerSKI::DigitizeHits START WCHCPMT->entries() = 0  
WCSimWCDigitizerSKI::DigitizeHits END DigiStore->entries() 0  
WCSimWCTriggerBase::AlgNDigits. Number of entries in input digit collection: 0  
Found 0 NDigit triggers  
Filling Root Event  
RAW HITS  
ngates = 0
```

No absorption!

40 occurrences in
mPMT simulation of
1000 events
- almost always ends
in WCPMT_container

only 2 occurrences
in 3" PMT simulation
of 1000 events
- neither ends in
WCPMT_container

maybe because source has
greater diameter?

mPMT Progress

- Starting to look at NHits on single 3" PMT as a function of radius
 - compare this to NHits on centre PMT in mPMT at same radius
- 10,000 events
- In WCSim code, PMT has radius of 40 mm

Source Radius (mm)	single PMT	mPMT (middle PMT only)
34	98580	98785
35	98578	98745
36	98379	95977
37	98018	90936
38	97651	86324

- I'll make some more complete plots and show them to Tom

Progress on Theo's Code

- Steadily making progress
- At point where I should have the image files of the rings that can be used by Tensorflow
- SciNet has been down for maintenance since yesterday morning, so can't check to see if it worked (or job might have been cancelled)
 - Should be back up tonight