

Combined analysis

Thursday, July 30

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1st R3BRoot Development Workshop
July 28 - 30, 2015
GSI, Darmstadt



Create a new Task, which will plot Clock of TOF hits when there are ≥ 2 NeuLAND hits



Create new Task

- r3broot/tof
- copy R3BTofFillTcal .h .cxx
- R3BTofRawAna inside of “tof” folder
- rename class
- remove parameters, array histograms



R3BTofRawAna declaration

- ➔ class TClonesArray;
- ➔ class TH1F;

- ➔ private:
 - TClonesArray *fLandMappedItems;
 - TClonesArray *fTofRawItems;
 - TH1F *fh_tof_land;



Source file

- `#include "TClonesArray.h"`
- `#include "R3BLandRawHitMapped.h"`
- `#include "R3BTofRawItem.h"`
- `#include "TH1F.h"`



Initialisation

- `FairRootManager *mgr = FairRootManager::Instance();`
- `fLandMappedItems = (TClonesArray*) mgr->GetObject("LandRawHitMapped");`
- `fTofRawItems = (TClonesArray*) mgr->GetObject("TofRawItem");`
- `fh_tof_land = new TH1F("h_tof_land", "", 100, 0., 10000.);`
- `return kSUCCESS;`



Event loop (part 1)

- `Int_t nLandItems = 0; // Counter for physical NeuLAND hits`
- `Int_t nItems = fLandMappedItems->GetEntries();`
- `for(Int_t i = 0; i < nItems; i++)`
- `{`
 - ➔ `R3BLandRawHitMapped *hit = (R3BLandRawHitMapped*)`
`fLandMappedItems->At(i);`
 - ➔ `if(! hit->Is17()) // Check if not a STOP signal`
 - ➔ `{`
 - `nLandItems++;`
 - ➔ `}`
- `}`



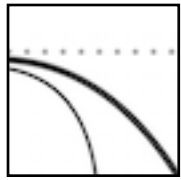
Event loop (part 2)

- if (nLandItems < 1)
- {
 - ➔ return; // Not enough NeuLAND hits - skip event
- }
- // Loop over TOF items
- for(Int_t i = 0; i < fTofRawItems->GetEntries(); i++)
- {
 - ➔ R3BTofRawItem *tofItem = (R3BTofRawItem*) fTofRawItems->At(i);
 - ➔ fh_tof_land->Fill(tofItem->GetClock()); // Fill histogram
- }



Finish Task

- `// Save histogram to output file`
- `fh_tof_land->Write();`



Linking against NeuLAND library

- CMakeLists.txt (tof directory)
 - ➔ set(INCLUDE_DIRECTORIES
 - `${R3BROOT_SOURCE_DIR}/land/unpack`
 - ➔ set(DEPENDENCIES
 - R3BLand

- Set(SRCS
 - ➔ ...
 - ➔ R3BTofRawAna.cxx

- Add to TofLinkDef.h :

- `#pragma link C++ class R3BTofRawAna+;`



- Recompile



- `cd r3broot/macros/r3b/unpack/tof`
- `copy run_s438b_lmd_beam.C to run_tof_land.C`



Steering macro (1)

- Add NeuLAND unpacker:

```
// NeuLAND MBS parameters -----  
Short_t type = 94;  
Short_t subType = 9400;  
Short_t procId = 12;  
Short_t subCrate = 0;  
Short_t control = 3;  
source->AddUnpacker(new R3BLandUnpack("", type, subType,  
                                     procId, subCrate, control));  
// -----
```



Steering macro (2)

- Add NeuLAND mapping task

```
// Channel mapping -----  
R3BLandMapping* map = new R3BLandMapping();  
map->SetFileName("../s438b/cfg_neuLAND_s438b.hh");  
map->SetNofBarsPerPlane(50);  
run->AddTask(map);  
// -----
```



Steering macro (3)

- Add analysis task
- `R3BTofRawAna *tofTask = new R3BTofRawAna();`
- `run->AddTask(tofTask);`



- Execute macro