

EXPERT ROOT - Developing #258

Comparison between ER track finding and stand-alone macro

01/17/2019 08:25 PM - Mikhail Kozlov

Status:	Открыта	Start date:	01/17/2019
Priority:	Высокий	Due date:	
Assignee:	Mikhail Kozlov	% Done:	80%
Category:	BeamDet	Estimated time:	0.00 hour
Target version:			
Description			
Explore adjustments of ER and stand-alone Vratislav's macro when results of the track finding coincide qualitative and quantitative and have the same events count and coordinates in the resulting distribution.			

History

#1 - 01/18/2019 01:21 AM - Mikhail Kozlov

- File *canv_compERReco_noClusters_BeamDetTarget.png* added
- File *canv_compERReco_noClusters_BeamDetTarget.root* added
- File *canv_compERReco_withClusters_BeamDetTarget.root* added
- File *canv_compERReco_withClusters_BeamDetTarget.png* added
- File *canv_compERReco_withClusters_D2Target.root* added
- File *canv_compERReco_withClusters_D2Target.png* added

Order of macros running:

- 1) exp1811_sim.C - creates setup configuration
- 2) recoBeamProjection.cxx, reco_he8_exp1811.C
- 3) drawProjections.C

Attention! My apologize, if exp1811_sim.C drops, you have to change QTelescopePartsExp1811.xml to QTelescopeParts2.xml on 16th line.

Offsets in Vratislav's macro are off.

Places in the code where changes happen:

- 1) Selection of multiplicity in ERBeamDetTrackFinder, lines 122-130:

```
if(fBeamDetMWPCDigiX1->GetEntriesFast() != 1 ||
   fBeamDetMWPCDigiX2->GetEntriesFast() != 1 ||
   fBeamDetMWPCDigiY1->GetEntriesFast() != 1 ||
   fBeamDetMWPCDigiY2->GetEntriesFast() != 1 ) {
LOG(DEBUG)   FairRun* run = FairRun::Instance();
run->MarkFill(kFALSE);
return ;
};
```

- 2) Switch between different targets in exp1811_sim.C, lines 59-63:

```
setupBeamDet->SetSensitiveTarget();
// ---- Create target -----
// FairModule* target = new ERTarget("target", kTRUE, 1);
// target->SetGeometryFileName(targetGeoFileName);
// run->AddModule(target);
```

- 3) In reco_he8_exp1811.C:

- a) line 1: fTriggerNum = 2; all comparisons in that comment are carried out with trigger == 2, but one can check results with other triggers by himself.
- b) change target volume name line 28: trackFinder->SetTargetVolume("targetBodyH2"); // targetBodyH2 - embedded BeamDet target volume, tubeD2 - D2 target volume;

- 4) drawProjections.C: all draw parameters to get proper plots.

- 5) recoBeamProjection.cxx:

- a) switching randomization in line 154: return (wire + /*gRandom->Uniform(-0.5, 0.5)* / - 16.5)*wireStep + planeOffset;
- b) lines 159-170:
cuts for the calculation with clusters:
if (GetClusterMult(dataX1)!= 1 || GetClusterMult(dataY1)!=1 || GetClusterMult(dataX2)!=1 || GetClusterMult(dataY2)!=1) {
fFill = false;

```

    return;
},
or with single wire:
if (dataX1->GetEntriesFast() !=1
    || dataY1->GetEntriesFast() !=1
    || dataX2->GetEntriesFast() !=1
    || dataY2->GetEntriesFast() !=1)
{
    fFill = false;
    return;
}

```

The first comparison was done without considering clusters, but only for those events where the multiplicity equals unit.

canv_compERReco_noClusters_BeamDetTarget.png

link to repository state: <https://github.com/ExpertRootGroup/er/tree/99ddfd72ef697f3c4946c9c6c02219e64fa148b6/macro/test/exp1811>

Clusters are used and used the target embedded in the Beamdet:

canv_compERReco_withClusters_BeamDetTarget.png

link to repository state: <https://github.com/ExpertRootGroup/er/tree/a669170b95f17077047b2b5436a3da0ecbb9449d/macro/test/exp1811>

Now, when we are assured that the results of reconstruction are the same, we introduce the D2 target to the simulation:

canv_compERReco_withClusters_D2Target.png

link to repository state: <https://github.com/ExpertRootGroup/er/tree/68b535ec7213f8947356496a2ff78fa165b07658/macro/test/exp1811>

In such configuration, we can see little difference of plots only by the edges. That happens because ER uses the method of determining coordinates by propagation of the ion through geometry and finds the destination point as the middle of step in target volume (step between input and output positions).

So on edges, some inaccuracy occurs.

#2 - 01/18/2019 02:18 AM - Mikhail Kozlov

- % Done changed from 0 to 80

#3 - 01/22/2019 05:15 PM - Mai Anh

- File Pics-BeamDet.pdf added

we have the full of the comparisons between 2 methods: no trigger, trigger = 1, trigger = 2 and trigger = 3.

Please see the file was attached for more details

Files

canv_compERReco_noClusters_BeamDetTarget.png	30.5 KB	01/17/2019	Mikhail Kozlov
canv_compERReco_noClusters_BeamDetTarget.root	11.8 KB	01/17/2019	Mikhail Kozlov

canv_compERReco_withClusters_BeamDetTarget.root	12 KB	01/17/2019	Mikhail Kozlov
canv_compERReco_withClusters_BeamDetTarget.png	33.5 KB	01/17/2019	Mikhail Kozlov
canv_compERReco_withClusters_D2Target.root	12.4 KB	01/17/2019	Mikhail Kozlov
canv_compERReco_withClusters_D2Target.png	33.1 KB	01/17/2019	Mikhail Kozlov
Pics-BeamDet.pdf	8.46 MB	01/22/2019	Mai Anh