

Status of adaptation of Monte Carlo to experimental data for the SRC experiment

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- Motivation
- The arm triggers in the geometry
- Experimental data and simulation procedure
- The efficiency of the arm triggers
- Momentum and efficiency
- Distributions in GEM stations
- Summary

- The main goal is analysis of nuclear cross section in the C+p reaction
- The efficiency of reconstruction can be obtained from the same analysis of Monte Carlo (MC) data.
- The problem of adaptation of MC data for experimental data arose

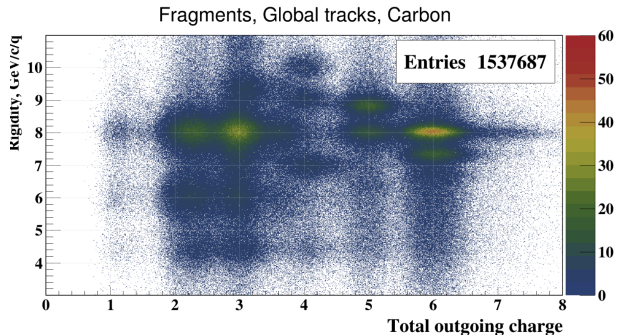


Figure: 1. Fragments of the reaction

The arm triggers in the geometry

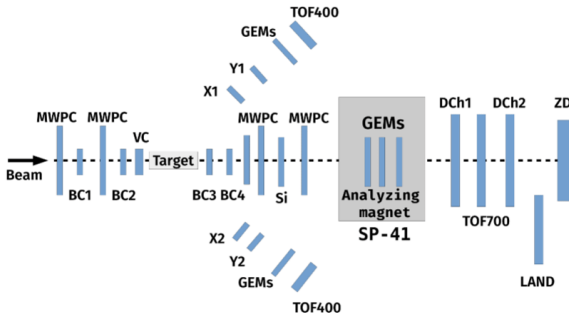


Figure 2. The experimental setup. The arm triggers are X1-2, Y1-2

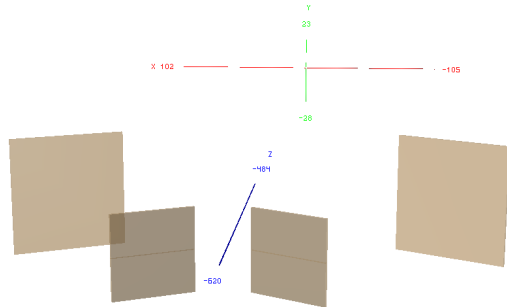


Figure 3. In the simulation chain

Experimental Data

Nº of Run	Triggers	Energy GeV	Target	Amount
3425	SRCT2 Full Trigger = IT & (X1 & Y1) & (X2 & Y2)	3.17	H2 (300mm)	50k

Simulation Data

```
TString inFile = "DQGSM_Cp_3.17 GeV_mb_100k_1.r12"
```

```
Bool_t useRealEffects = kFALSE;
```

```
.....
```

```
primGen->SetBeam(0.5, -4.6, 1.2, 1.2);
```

```
primGen->SetTarget(-647.5, 30.0);
```

```
primGen->SmearVertexZ(kTRUE);
```

```
primGen->SmearVertexXY(kTRUE);
```

```
.....
```

```
MpdLAQGSMGenerator* guGen = new MpdLAQGSMGenerator(inFile.Data(), kFALSE);
```

```
primGen->AddGenerator(guGen);
```

Efficiency of the arm triggers

Table: Efficiency of triggers

Efficiency of triggers	MC	Experiment
X1	96.0	98.0
X2	98.3	96.3
Y1	95.9	96.7
Y2	97.4	96.0
X1 & Y1	91.5	93.8
X2 & Y2	95.0	90.5

$$Eff_{X_i} = \frac{NumberOfEvents_{X_i, Y_i, GEM_i, TOF400_i}}{NumberOfEvents_{Y_i, GEM_i, TOF400_i}}$$

$$Eff_{Y_i} = \frac{NumberOfEvents_{X_i, Y_i, GEM_i, TOF400_i}}{NumberOfEvents_{X_i, GEM_i, TOF400_i}}$$

$$Eff_{X_i \& Y_i} = \frac{NumberOfEvents_{X_i, Y_i, GEM_i, TOF400_i}}{NumberOfEvents_{GEM_i, TOF400_i}}$$

Momentum and matching efficiency

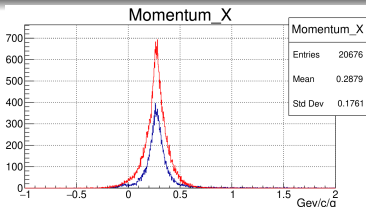


Figure 4 Momentum along x-direction

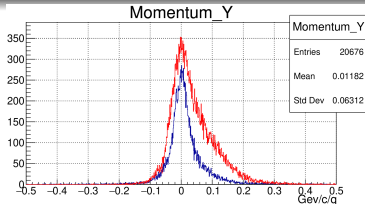


Figure 5. Momentum along y-direction

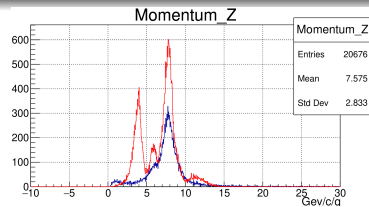


Figure 6. Momentum along z-direction

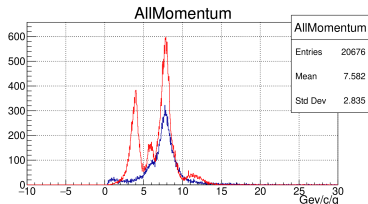


Figure 7. the summary momentum

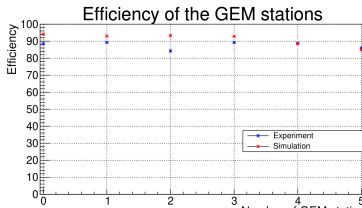


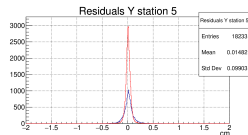
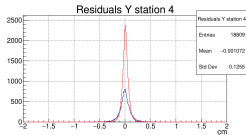
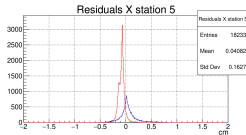
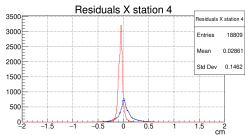
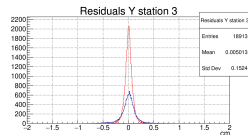
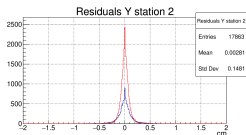
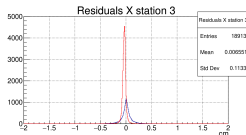
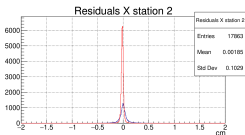
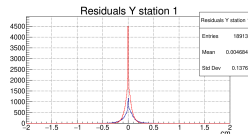
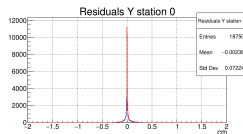
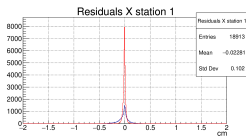
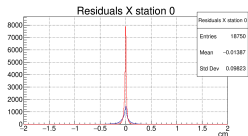
Figure 8. The efficiency of matching

$$Eff = \frac{N_{globTracksInStation}}{N_{globTracks}}$$

Blue is experiment, Red is MC

Distributions in GEM stations

residuals X



The main results

- The arm triggers were added in the simulation procedure. It allows us to choose the events in which the triggers worked.
- The efficiency of arm triggers was calculated.

We plan:

- to use D-tracks and U-tracks in reconstruction procedure
- to use Lorentz shift in the simulation procedure
- to add BC3 and BC4 triggers in the simulation procedure